PROCEEDINGS & TRANSACTIONS

OF THE

CROYDON NATURAL HISTORY AND SCIENTIFIC SOCIETY.

BRITISH MUSEUM NATURAL HISTORY

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FROM FEBRUARY 21ST, 1899, TO JANUARY 20TH, 1903.

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PROCEEDINGS & TRANSACTIONS

OF THE

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1900.

PROCEEDINGS

OF

THE CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

1899—1900.

Thirtieth Annual Meeting,

Held at the Public Hall, Croydon, January 16th, 1900.

Wm. Whitaker, B.A., F.R.S., P.G.S., in the chair.

The Statement of the Accounts for 1899 was approved.

The President announced that the following gentlemen had been nominated as Officers of the Club for the ensuing year, and there being no other nominations they were duly elected:—President, William Whitaker, B.A., F.R.S., P.G.S.; Hon. Secretary and Treasurer, F. J. Townend; Librarian, A. Roods; and J. E. Clark, B.A., B.Sc., and R. F. Grundy to fill the vacancies on the Council caused by the retirement (under the Rules) of Jas. Epps, Jun., F.L.S., and G. E. Newby, F.R.C.S.

The following is the list of the Officers for the year 1900:—

President.—William Whitaker, B.A., F.R.S., P.G.S.
Vice-Presidents.—John Berney, F.R.M.S.; Philip Crowley, F.L.S., F.Z.S.; Henry S. Eaton, M.A., F.R.Met.Soc.; Henry T. Mennell, F.L.S.; Henry G. Thompson, M.D., J.P.; Edward Lovett; H. Franklin Parsons, M.D., F.G.S.; W. Murton Holmes; J. M. Hobson, M.D., B.Sc.
Hon. Secretary and Treasurer.—F. J. Townend.
Librarian.—Alfred Roods.

Council.—J. H. Baldock, F.C.S.; J. Edmund Clark, B.A., B.Sc., F.G.S.; H. D. Gower; R. F. Grundy; A. J. Hogg; G. W. Moore; E. Pierce; E. J. Platts; N. F. Robarts, F.G.S.

Botanical Committee. — Arthur Bennett, F.L.S., High Street, Croydon; J. Edmund Clark, B.A., B.Sc., Avondale, Coombe Road; James Epps, F.L.S., Norfolk House, Beulah Hill, Upper Norwood; A. Fitzgerald, 93, Addiscombe Road; Miss Klaassen (Hon. Sec.), Aberfeldy, Campden Road; H. T. Mennell, F.L.S., Park Hill Rise; H. Franklin Parsons, M.D., F.G.S., Park Hill Rise; Mrs. Parsons, Park Hill Rise; C. E. Salmon, Clevelands, Wray Park, Reigate; Ernest Straker, Wallington.

Geological Committee. — W. B. Bannerman, F.G.S., Sydenham Road; George Hinde, Ph.D., F.R.S., F.G.S., Avondale Road; A. J. Hogg, 5, Cargreen Road, South Norwood; G. W. Moore, Bryndhurst, Dornton Road; H. Franklin Parsons, M.D., F.G.S., Park Hill Rise; N. F. Robarts, F.G.S. (Hon. Sec.), 23, Oliver Grove, South Norwood; W. W. Topley, 3, Marlborough Road; Thos. Walker, C.E., Warrington Road.

Meteorological Committee. — F. C.-Bayard, LL.M. (Hon. Sec.), Wallington; J. Edmund Clark, B.A., B.Sc., Avondale, Coombe Road; Thos. Cushing, F.R.A.S., Chepstow Road; Baldwin Latham, C.E., Duppas House, Croydon.

Microscopical Committee. — Rev. R. K. Corser, 57, Park Hill Road; T. A. Dukes, M.B., B.Sc., 16, Wellesley Road; E. Lovett, West Burton, Outram Road; W. Murton Holmes, Glenside, St. Peter's Road; G. W. Moore (Hon. Sec.), Bryndhurst, Dornton Road.

Photographic Committee. — J. H. Baldock, F.C.S. (Lanternist and Recorder), St. Leonard's Road; H. D. Gower, 55, Benson Road; E. Pierce (Hon. Sec.), Claremont, Balfour Road, South Norwood; E. J. Platts, St. Leonard's Road; Alfred Roods, 67, Thornhill Road; C. J. L. Russell, 56, Coombe Road; A. J. Weightman, Langdale, Chepstow Rise.

Zoological Committee. — John Berney, F.R.M.S., Chatsworth Road; Philip Crowley, F.L.S., F.Z.S., Waddon; John Henry Drage (Hon. Sec.), Tamworth Road, Croydon; C. H. Goodman, Bryn Cottage, Whyteleaf; R. McLachlan, F.R.S., F.L.S., 23, Clarendon Road, Lewisham.

Anthropological Committee. — H. C. Collyer, Beddington; J. M. Hobson, M.D., B.Sc., Morland Road; A. J. Hogg, 5, Cargreen Road, South Norwood; E. Lovett (Hon. Sec.), West Burton, Outram Road; N. F. Robarts, F.G.S., Oliver Grove, South Norwood; J. Watson Slack, 56, Park Lane; H. G. Thompson, M.D., 86, Lower Addiscombe Road; G. Clinch, F.G.S., 22, Nicholson Road.

Museum Committee. — J. H. Drage, Tamworth Road; J. M. Hobson, M.D., B.Sc., Morland Road; E. Lovett, West Burton, Outram Road; H. T. Mennell, Park Hill Rise; H. Franklin Parsons, M.D., F.G.S., Park Hill Rise; N. F. Robarts, 23, Oliver Grove, South Norwood (Hon. Sec. and Curator).

In accordance with a notice given at the last meeting on December 12th, Mr. Baldock moved, and Mr. Roods seconded, a motion that in future the Committee of the Club should be styled the "Council," and the various "Sub-Committees" should be styled the "Committees." This was unanimously carried.

In accordance with a notice which appeared in the circular for this month, it was moved by the President, and seconded by Mr. Baldock, that a portion of the Club's Library should be transferred to the Reference Library at the Town Hall, the President remarking that members of the Club, on satisfying the Librarian of their membership, would be allowed to take away any of the books placed there, but that other people would only be allowed access to them at the Library. He also called attention to the board placed over the Museum cases at the Town Hall, stating that they belonged to the Club. The expense of the board has been defrayed by Mr. W. B. Bannerman, to whom a hearty vote of thanks was accorded. The President also gave notice that at the next meeting he should move that a Curator be appointed, to be *ex-officio* a member of the Council.

The usual summary of the Proceedings and Meetings of the year has been prepared by the Editorial Committee, and follows the Address.

The President's Address.

Ladies and Gentlemen,

It has been usual on these occasions for the President to give a *résumé* of the work done by the Society in the past year. Though there may be a good deal to be said for this proceeding, yet it seems to me that it should be done in a Report from the Council, rather than in the Address of the President.

If you must follow the lead of many other Societies, and insist on having an Address, a proceeding which I regard as most mistaken, then surely it would be better to leave your President to choose his text, and, rather than limit him to a *réchauffé* of our own proceedings, to allow him to hash up any other mental food that he can readily deal with. Moreover, you have all had the chance of attending the evening meetings, and, if you have not done so, it is not clear to me that it is the duty of a President to tell you all about them.

A record of the proceedings of our sections should perhaps be given to you, especially as regards excursions; but I think that such record is secretarial and not presidential work. As a matter of fact, it is done by the sectional secretaries, and surely

they should communicate their several Reports to the general Secretary, for inclusion in a general Report.

You see, then, that I have a strong feeling that a President should be saved from work as much as possible: it is the business of a Secretary to do the writing for a Society, whilst a President has only to do right. Being somewhat of an evolutionist, or revolutionist, which are much the same thing, the difference between them being one of amount only—I venture to break through the established rule, and I propose to draw your attention not so much to what we have done ourselves as to what other folk have done for us,—to give you a short account of work that has been done on the Geology of Surrey during the nineties. Naturally, as ours is a general and not a special Society, this greatly exceeds our own geologic work, and therefore it is all the more important that we should know of it. During the period named, however, our Society has made good contributions to our stock of knowledge of local geology, by the publication of the papers abbreviated titles of which are given below, and of accounts of various excursions.

W. M. Holmes. Glauconite Casts from Godstone Firestone.
W. M. Holmes. Microscopic Structure of Hearthstone from Betchworth.
W. Whitaker. Surrey Wells.
Dr. Parsons. Sewer Section at Park Hill Rise.
Dr. Hinde. Gravels of Croydon and its Neighbourhood (a paper of general as well as of local interest).
N. F. Robarts. Occurrence of Mammalian Remains near Purley.
W. Whitaker and E. T. Newton. Drift Deposit at Carshalton.

It seemed to me that if my retrospect were carried back for ten years that would be enough, especially as in 1889 a fairly exhaustive account of our Tertiary Beds, including the Drift associated with them, was given in a Geological Survey Memoir.* Comparatively little of the work that I have to bring before you refers to the tract covered by that Memoir.

1890.

Part III. of Sir J. Prestwich's Papers on the Westleton Beds is devoted to The Southern Drift,† and its distribution in Surrey is treated of on pp. 158–160. The best exhibition of this is on the Tertiary hills, in the gravel of Norwood, of Wimbledon Common, of St. George's Hill near Weybridge, and of Chobham Ridges.

The valley of Smitham Bottom is noticed (pp. 171–173). The

* The Geology of London, &c. 2 vols.
† Quart. Journ. Geol. Soc., vol. xlvi, pp. 155–181, pl. viii.

gravel in its upper part above Merstham contains fragments of hard beds of the Lower Greensand, so that "this Drift was deposited before the strata beyond the [Chalk] escarpment had been removed, and when the valley was prolonged . . . into the Wealden area."

Dr. A. Irving also took up the subject of "The Plateau-gravels of East Berks and West Surrey,"* reviewing some of Sir J. Prestwich's conclusions. He alludes to the mass of coarse gravel of Hungry Hills, Aldershot, as an illustration of the great amount of Upper Chalk that must have been worn away to furnish the flints, and concludes that the Plateau-gravels are of fluviatile origin and of Pliocene age.

In a paper on Pleistocene Mollusca † B. B. Woodward notices two Surrey localities of fossiliferous Alluvium, Kew and Blackfriars (pp. 340, 342).

Our member H. M. Klaassen contributed a paper on "The Pebbly and Sandy Beds overlying the Woolwich and Reading Series on and near the Addington Hills,"‡ in which he recorded the section shown by the excavations for a sewer from the windmill in Shirley Road to near the top of the hills, for a distance of 1636 ft. The new sections showed that the pebbles were underlain by sand, beneath which come the Woolwich and Reading Beds, consisting of clays over pebbles and sand. The section of a cutting for a sewer in Oaks Road is also recorded. An account of the excavations for the reservoir by Dr. G. J. Hinde is included: these were wholly in the Blackheath pebble-beds, in which some pebbles of quartzite were the only stones found other than those of flint.

In this year there was an epidemic of notes on the Denudation and Elevation of the Weald, in the pages of the 'Geological Magazine,'§ by H. W. Monckton, Dr. A. Irving (three), and Sir J. Prestwich. Though of a general nature they are of Surrey interest, and the second refers to the sands of Chipstead, &c. I may claim some credit for not having been infected, the subject being one in which I am somewhat interested.

Dr. J. G. Garson and G. F. Lawrence have noticed "Skulls dredged from the Thames in the neighbourhood of Kew" and "the Geological Position of the Skulls,"‖ but whether the fifteen skulls belong to Surrey or to Middlesex, or to both counties, is a moot point. They seem to belong to the dolichocephalic race, who inhabited the country before "the brachycephalic or Celtic race usually associated with the Bronze period."

* Quart. Journ. Geol. Soc., vol. xlvi, pp. 557–564.
† Proc. Geol. Assoc., vol. xi, no. 8, pp. 335–388.
‡ *Ibid.*, pp. 464–472.
§ Dec. iii, vol. vii, pp. 395–397; 403–409; 479, 480; 575, 576.
‖ Journ. Anthrop. Inst.

Sections of the river-bed are given. The skulls came "from the lowest layer of the river-bed" overlying the London Clay.

1891.

Sir J. Prestwich's paper on the Valley of the Darent and on the Origin of the Chalk escarpment,* refers partly to the eastern margin of Surrey, into which the basin of the Darent runs. As, however, the paper mainly concerns Kent, we may be content with noting the special references to our county.

The occurrence of rude flint implements on the high grounds of Titsey and Tatsfield is noted (p. 132). The high-level Limpsfield gravel is treated of (pp. 137, &c.), and the brickearth of Limpsfield Common (pp. 145, 146).

A description of an "Excursion to the Bagshot Country between Aldershot and Brookwood," with some notes on the gravels and the Bagshot Beds, appeared this year,† as also one of an "Excursion to Leith Hill," by our former member W. Topley,‡ in which the features of the country are noticed.

Whether the specimens from which C. D. Sherborn and H. W. Burrows drew up their "Report on the Microscopical Examination of . . . London Clay from . . . Cannon Street Railway Bridge"§ came from Surrey or from Middlesex is doubtful: anyhow, they came from the borderland of the river-bed. Twenty-five samples, in vertical order, are described, and many species of Foraminifera noted.

In their paper "On some Recent Sections at Dulwich," T. Leighton and J. B. Ogle || describe a section some 700 ft. long, of Woolwich and Reading Beds with Drift, in the grounds of the London and County Athletic Club. The old landmarks of Dulwich having mostly gone, and the description of sections seen many years ago not being in accord with modern topography, the authors have kindly translated three of my own notes of obsolete localities into the modern tongue, for which I heartily thank them. The Woolwich Beds noticed consist of mottled clay, underlain by clay shell-beds, underlain by sandy clay, and the Drift (brickearth, gravel and sand) rests irregularly on the upper two, at one place filling a pipe or channel.

H. W. Monckton described an "Excursion to Guildford,"¶ giving an account of sections of the Bargate Stone, and of the succession of beds in the Lower Greensand.

An "Excursion to West Surrey"** was also noticed, by W. H.

* Quart. Journ. Geol. Soc., vol. xlvii, pp. 126–163, pls. vi–viii.
† Proc. Geol. Assoc., vol. xi, no. 9, pp. cliv, clv.
‡ *Ibid.*, pp. clxiii–clxvii.
§ *Ibid.*, vol. xii, no. 1, pp. 4–7.
|| *Ibid.*, pp. 8–15.
¶ *Ibid.*, pt. 3, pp. 97–99.
** *Ibid.*, pp. 100–104.

Hudleston, who treats of Bagshot Beds and Gravelly Drifts, and criticizes the Geological Survey mapping and classification of the beds at St. Anne's Hill, near Chertsey.

In this year appeared that very useful work, the Geologists' Association's 'Record of Excursions,' during the years 1860 to 1890. Of this pp. 74 to 114 are devoted to Surrey, the places mentioned in the titles being Addington, Box Hill, Caterham, Chilworth, Croydon, Dorking, Epsom, Godstone, Guildford, Kew, Kingston, Leith Hill, Mole (Valley of), Nutfield, Redhill, Richmond, Riddlesdown, Shirley, and Tilburstow.

In "Physical Studies of an Ancient Estuary,"* Dr. Irving treats of the Bagshot Beds of the London Basin generally.

J. T. Harrison's paper "On the Subterranean Water in the Chalk Formation of the Upper Thames, and its Relation to the Supply of London,"† deals, of course, with Surrey, including some parts that can hardly be described as connected with the Upper Thames, such as the Basin of the Wandle, with a map of its Chalk gathering ground (pp. 5, 7–10). Other references to Surrey are to be found on pp. 12, 14, 15, and in the discussion, on pp. 26, 31, 52–57, 60, 63, 64, 67, 71, 73–75, 85–87, 96, 98.

T. Leighton, in the abstract of his paper "On Recent Discussions relating to the Geology of the South-East of England,"‡ refers to the Bagshot Question, to the Sands of doubtful Age on the North Downs, and to Coal in South-East England. The first he describes "as an attempt to establish certain unconformities which do not exist," in which many geologists will agree with him; but the other two are left as open questions.

1892.

H. W. Monckton's paper "On the Gravels south of the Thames from Guildford to Newbury" § refers partly to Surrey.

"The greater part of the hill-gravel . . . belongs to the Southern Drift of Prof. Prestwich," which consists "of materials derived from the Wealden area of Kent and Surrey, the Chalk . . . Eocene formations . . . and older gravels." The author thinks it to be "the gravel of old rivers which had little or no relation to our present river-system." The gravel of Chobham Ridges and the Fox Hills is an example of this Drift.

The gravels of the valleys and terraces are of local origin, and largely derived from the older gravels.

The same author also gave a paper on "The Bagshot Beds of Bagshot Heath,"‖ which is concerned with a controversy as to

* Geol. Mag., dec. iii, vol. viii, pp. 357–364.
† Proc. Inst. Civ. Eng., vol. cv, pt. iii, pp. 1–99, pls. 1, 2.
‡ Twentieth Ann. Rept. S. Lond. Micr. Nat. Hist. Club, pp. 9, 10.
§ Quart. Journ. Geol. Soc., vol. xlviii, pp. 29–47.
‖ *Ibid.*, pp. 48–59.

the classification of certain beds with Upper Middle or Lower Bagshot, a discussion which I always avoid when I can, as now, especially as the district is to a great extent not in Surrey. Those who wish for more of it should refer also to the "Rejoinder," by Dr. A. Irving.* I am glad to find that W. H. Hudleston has come to much the same conclusion as that which I have independently reached: "It might, indeed, simplify the problem if we abolished the so-called Middle and Upper Bagshots [meaning the names, not the deposits, which, unfortunately, are beyond our power], and replaced those names by those of the richly fossiliferous Hampshire equivalents."†

Prof. G. S. Boulger gave an account of an "Excursion to Wotton and Ranmer,"‡ noting a junction-section of Gault and Folkestone Beds, and other sections of Lower Greensand.

In "The Hybodont and Cestraciont Sharks of the Cretaceous Period,"§ A. S. Woodward figures specimens from the Lower Chalk of Guildford and of Warlingham: the latter perhaps should have been noted as Middle Chalk (pl. 2).

J. W. Grover, in "An Explanation of the London Water Question,"‖ advocates the taking of a large amount of spring water from the Basin of the Mole, near Leatherhead (pp. 214, 215).

F. Lasham, in "Palæolithic Man in West Surrey,"¶ records the finding of a good flint implement at Worplesdon, in "ballast" said to have come from Farnham. This led to a search in the latter neighbourhood, which has resulted in the finding of more than three hundred specimens. The Farnham gravels are noticed and some implements described.

1893.

Two papers, by H. W. Monckton "On the Occurrence of Boulders and Pebbles from the Glacial Drift in Gravels south of the Thames," and by O. A. Shrubsole "On the Plateau-gravel South of Reading,"** refer to our county, one of the districts described in the former being "Weybridge, Kingston, and Wimbledon," whilst Chobham Ridges is one of the localities alluded to in the latter.

Mr. Monckton concludes that, though probably "rivers flowing in the direction of the present Thames and Kennet existed at the time when the Glacial Gravel was spread out, the valleys in

* Quart. Journ. Geol. Soc., vol. xlviii, pp. 485–487.
† *Ibid.*, vol. xlix, Proceedings, p. 101 (Presidential Address).
‡ Proc. Geol. Assoc., vol. xii, pts. 9, 10, pp. 403–406.
§ Proc. Yorksh. Geol. Soc., vol. xii, pt. i, pp. 62–68, pls. 1, 2.
‖ Trans. Surveyors' Inst., vol. xxiv, pt. vii, p. 195.
¶ Coll. Surrey Archæol. Soc., vol. xi, 5 pp., 2 pls.
** Quart. Journ. Geol. Soc., vol. xlix, pp. 308–324.

which those rivers now flow have to a large extent been excavated since."

An important contribution to the literature of one of our chief formations was given by Prof. Boulger and T. Leighton in their paper "On the Lower Greensand Area . . . between Wotton and Dorking,"* in which they advocate the extension of the Folkestone Beds, at the expense of the Hythe Beds, southward to the great east and west "Rookery Fault." The Rookery section is described and seven new sections. As it is allowed that "it is difficult, in words, to express the difference between the Hythe and Folkestone Beds of this district," we need not be surprised that a reading adopted by the Geological Survey many years ago does not now commend itself to everybody, especially as so much fresh information is to hand. The classification of the Bargate Stone is discussed. I am by no means ready to join in the idea of the authors that they will be "charged with presumption in attempting to correlate beds upon lithological evidence only." It is very good evidence, when rightly used, especially when there is no other.

An account of an "Excursion to Farnham"† deals with Gravels, Gault, Folkestone Beds, and flint implements; whilst one of an "Excursion to Dorking"‡ refers to the subject of the paper last noticed.

T. Leighton also described an "Excursion to Abinger,"§ noticing gravel and various sections in the Lower Greensand of Leith Hill.

The Report of the Royal Commission on the Water Supply of the Metropolis, with its bulky Minutes of Evidence and Appendices, contains much matter relating to Surrey, for the analysis of which more time would be needed than I can at present dispose of.||

1894.

In his Presidential Address to the Geological Society, W. H. Hudleston refers to the question of "Coal in the South-east of England," concluding that, if "a coal-basin exists within hail of the metropolis, it is quite as likely to be found between Croydon and Reigate as anywhere else. If the Board of Trade could be persuaded to bore at suitable intervals along a line connecting those two towns, geological science would certainly be a gainer, and Surrey as well as Kent might be proved to have its coalfield."¶ I should like to see some one suggesting such a course

* Proc. Geol. Assoc., vol. xiii, pt. 1, pp. 4–16.
† *Ibid.*, pt. 3, pp. 74–81.
‡ *Ibid.*, pt. 5, pp. 140, 141.
§ *Ibid.*, pp. 163–167.
|| Fol. Lond.
¶ Quart. Journ. Geol. Soc., vol. l, Proceedings, p. 71.

to the Board of Trade, or to any other Government Department! And I should like to see some one else doing the borings.

In his paper on "The Bargate Beds of Surrey and their Microscopic Contents," F. Chapman* has added largely to our knowledge of that part of the Lower Greensand.

He thinks that these beds are neither the base of the Folkestone Beds nor the top of the Hythe Beds, both of which suggestions had been made; but are rather a distinct series, perhaps representing the intervening Sandgate Beds, which had been supposed to be absent here.

Like the Sandgate Beds, these Bargate Beds contain much clayey matter, and they thin out toward the area where the former occur.

Two sections near Guildford are noticed in great detail, with an account of the heavy minerals in one case, and with microscopic sections in the other.

The Ostracoda and the Foraminifera are described, there being 20 species of the former (of which 7 are new, and 4 are Jurassic forms), and 139 of the latter (of which 11 are new, and 107 others hitherto unrecorded from beds of this age). This part of the paper (41 pages) should be of interest to our microscopic members.

A. S. Woodward's "Notes on the Sharks' Teeth from British Cretaceous Formations"† has a reference to one Surrey specimen, from Upper Chalk near Guildford (pl. v, fig. 13).

Dr. W. F. Hume's general paper, "The Genesis of the Chalk,"‡ is of interest to all chalky counties.

An "Excursion to Oxted and Titsey"§ contains but a short reference to two pits in the Folkestone Beds.

The paper by B. Fowler on "the Hythe Beds . . . in the Liphook and Hindhead District"‖ refers to our county and the bordering part of Hampshire. Various sections and springs are noticed.

An account of an "Excursion to Redhill and Nutfield"¶ deals with the Fuller's earth and with the classification thereof.

Dr. J. W. Gregory's notice of an "Excursion to Guildford and Shalford,"** contains a map showing the outcrops of the Gault and of the following divisions of the Lower Greensand:—Upper Sands, Bargate, Pebble Beds, Lower Sands, Passage Beds and Atherfield Clay, the Bargate Beds irregularly disposed in the Pebble Beds, and not at one horizon.

* Quart. Journ. Geol. Soc., vol. l, pp. 677–730, pls. xxxiii, xxxiv.
† Proc. Geol. Assoc., vol. xiii, pt. 6, pp. 190–200, pls. v, vi.
‡ *Ibid.*, pt. 7, pp. 211–246.
§ *Ibid.*, pt. 8, p. 291.
‖ *Ibid.*, pts. 9, 10, pp. 361–365.
¶ *Ibid.*, pt. 10, pp. 371–374.
** *Ibid.*, pp. 377–381.

Though Dr. J. W. Gregory's paper, "The Evolution of the Thames,"* is of a general character, and contains no special reference to Surrey, yet, as we have a share in that river, we are concerned therewith.

1895.

T. Leighton's paper, "The Lower Greensand . . . of East Surrey,"† which deals especially with the Hythe Beds and the Sandgate Beds, is of importance both for the details given and for the conclusions drawn from these as to the classification of the beds.

He concludes (1) that the chert-beds at Leith Hill and to the west have been eroded south of the escarpment southward of Dorking; and that, "instead of a lithological change from east to west," as had been supposed, there is one "from south to north, from deep-water beds to shallow"; (2) "that at the base of the Folkestone Sands an area of pebbles . . . can be traced . . . from Leith Hill to Tilburstow Hill, the pebbles becoming smaller . . . eastward"; (3) "that the Lower Greensand of this area consists of beds formed in a marine estuary or shallow sea," and "that no correlation with beds at Hythe and Sandgate is possible."

He thinks that there are "groups of beds developed locally throughout this area," as follows:—1. "The Fuller's Earth Beds . . . between Reigate and Tilburstow Hill." 2. "The chert-beds of Leith Hill and . . . to the west," in two divisions. 3. "The clayey sands . . . south of Dorking." 4. "The iron-sands which overlie the Atherfield Clay . . . throughout . . . the district."

The Chert-beds of Leith Hill and the Pebble- and Chert-beds east of Dorking are described in detail, with a useful digression to the Fuller's earth in the latter case. A comparative table of sections (six compilations) from east of Dorking to east of Bletchingley is given, and a summary of the author's conclusions. The paper itself should, of course, be studied by our geologic members.

Dr. J. W. Gregory, in his account of an "Excursion to Chilworth,"‡ gives a map of the neighbourhood of Woodhall, of like kind to that of 1894, but on a larger scale, introducing "Chert Series" between the Pebble Beds and the Lower Sands, and omitting the Bargate Stone, which has disappeared.

In the notice of an "Excursion to Betchworth and Headley,"§ H. W. Monckton treats of the Eocene outliers, of the sands of doubtful age, but later than Eocene, of the gravels, and of the clay-with-flints.

* Nat. Sci., vol v, p. 97.
† Quart. Journ. Geol. Soc., vol. li, pp. 101–124.
‡ Proc. Geol. Assoc., vol. xiv, pt. 3, pp. 120–124.
§ *Ibid.*, pp. 124–128.

T. Leighton's account of an "Excursion to Tilburstow Hill"* continues his work eastward (see first notice of this year). I beg leave to doubt whether the beds in the large pits north of the high road can be altogether grouped with the Folkestone Beds. Late visits to this long line of section, perhaps now in better form than then, lead me to think that Sandgate Beds and Hythe Beds are also shown, Folkestone Beds only at one part.

In noticing "Fossils from the Lower Greensand of Great Chart, in Kent,"† and the beds from which they came, Dr. J. W. Gregory refers to other parts, including Surrey, giving a table of our representatives of the Kentish beds, and making the upper part of our Folkestone Sand the equivalent of the Lower Gault further east.

G. E. Grimes records "Two Occurrences of Radiolarians in English Cretaceous Rocks,"‡ one being in the rock above the Fuller's earth of the Lower Greensand between Redhill and Nutfield, the other in the Upper Greensand of Colley Farm, near Reigate.

W. G. Peirce, in a Presidential Address,§ drew attention to the water-supply of Richmond, from a well and galleries in the Chalk.

In this year there was a re-issue of Prestwich's important work, "A Geological Inquiry respecting the Water-bearing Strata of the Country around London, . . ."‖ with a new Preface and "Preliminary Remarks," referring to the deep borings that have been made since the original issue, and to the possibility of getting water from the Lower Greensand deep underground.

Sheet 12 of the Index Map of the Geological Survey, printed in colours, on the scale of four miles to an inch, was published this year. It represents the whole of Surrey, and much more; but, as we have a copy, no more need be said of it.

1896.

T. Leighton again adds to our Lower Greensand literature, by an account of an "Excursion to Dorking and Leith Hill."¶ An outcrop of Bargate Sand and Stone, from beneath Folkestone Sands, was found at Dorking, three miles east of any record. Several other sections are noticed.

One of our members, Mr. B. Latham, in the discussion on a

* Proc. Geol. Assoc., vol. xiv, pt. 5, pp. 191, 192.
† Geol. Mag., dec. iv, vol. ii, pp. 97–103, 187, 188.
‡ *Ibid.*, pp. 345–347.
§ Trans. Soc. Eng., pp. 16, 17 (of separate copy).
‖ 8vo. London.
¶ Proc. Geol. Assoc., vol. xiv, pt. 8, pp. 331–335.

paper on Percolation Gauges, refers to two that he had made in Surrey.* One was on the Chalk Downs and the other in the gravel part of Croydon. "After about sixteen years he found that the vegetation which was natural to the downs had changed its character and was putting on a new garment altogether, and growing at a very different rate to the rate at which herbage on the downs generally grew." He found that "more water passed through a chalk percolating gauge than actually flowed off a chalk area," and that "the average percolation through a chalk gauge was 11·18 inches at Croydon out of a rainfall of 26·08 inches."

1897.

In this year there appeared a paper of considerable interest to Croydon geologists, by W. P. D. Stebbing, on "Boulders of Granite from the Middle Chalk of Betchworth, . . ."† as one of the best known occurrences of the sort is that at the Haling pit, generally and wrongly called the Purley pit.

The two stones described came from the zone of *Terebratulina gracilis*, and their weights were 7lb. 7oz. and 3lb. 12oz., the former being a fine-grained much decomposed rock with valves of *Spondylus* and *Serpulæ* attached; the later being of a coarser kind, and less decomposed.

The author thinks that coast-ice was probably the means of transport, but allows that in some like cases entanglement in the roots of trees may have acted.

With the conclusion that boulders "seem to come chiefly from the Middle Chalk," I am hardly disposed to agree, as the richest locality I know of is close to the base of the Lower Chalk at Gayton, in Western Norfolk, whence I have got many boulders of various kinds.

In the report of an "Excursion to Redhill and Merstham,"‡ a Fuller's earth pit, near Redhill Station, is noticed, also a section of Drift loam over Folkestone Beds at Frenches (see 1899), and a sand with phosphatic nodules further north. The new railway-cutting near Merstham is described, and then the large pit in Middle and Lower Chalk.

F. Meeson's account of an "Excursion to Woking"§ deals with the Bagshot Beds.

Our member E. A. Martin ‖ alluded to "Foreign Boulders in the Chalk," discussing the method of transport and referring to the Haling and to the Betchworth stones. Prof. Bonney objects

* Trans. Soc. Eng., pp. 170, 171.
† Quart. Journ. Geol. Soc., vol. liii, pp. 213–220, pl. xv.
‡ Proc. Geol. Assoc., vol. xv, pt. 3, pp. 113–115.
§ *Ibid.*, pt. 5, pp. 185–188.
‖ Geol. Mag., dec. iv, vol. iv, pp. 169, 170.

to his conclusion that the Betchworth boulders may have come from the West of England.*

The little work by H. B. Woodward, entitled "Soils and Sub-soils from a sanitary point of view; with especial reference to London and its Neighbourhood,"† is one that most of you should have. The coloured map of sub-soils, arranged according to composition, is a new adaptation of a geologic map, and the work is throughout of great practical interest.

In this year appeared a very elaborate paper, by Prof. W. F. Barrett, "On the so-called Divining Rod,"‡ and Surrey is in the running. A successful case at Holmwood is recorded on p. 99; but without any note of the geology of the sites referred to. "The Richmond Experiments" are described in pp. 188–195, and we hear that "the results were only of transient success." As two diviners were employed, and their "results were rather startlingly different," one can hardly speak of success. The experiments were made in a gallery at the Waterworks, deep underground. That the moderate success was "transient" may be gathered from the facts, chronicled by the engineer, that "the one bore-hole that yielded 8000 gallons a day on the first day gradually fell off and was exhausted at the end of the week," and that twenty-two bore-holes gave "a very small increase in the quantity of the water." It is only right to say that the cost of the experiment was not borne by the Corporation, but by one of its members, and purely as a test.

"The Wimbledon Experiments" were made by the author himself, to test "the lad who bears the appropriate name of Fred. Rodwell," and the account of them takes up pp. 203–206. We hear of one experiment that "here he blundered a good deal"; of another that "the test was . . . a complete failure"; in another an old well, grassed over, was crossed and recrossed without any indication of water; in yet another a hidden tank, full of water, fared the same way. Other smaller kinds of failure are chronicled, and therefore we may agree with the author that "the result was unsatisfactory" from the dowsing point of view, though I could hardly join him in adding "or, to say the least, inconclusive"; for it seems to me conclusive enough, as far as regards this one performer.

The balance, then, of the Surrey evidence is not in favour of the magic twig.

P. Griffith, in treating of the "Water Supply of Small Towns, . . ."§ described the second Godalming works (pp. 68–

* Geol. Mag., dec. iv, vol. iv, pp. 238, 239.

† Geological Survey Memoir. 8vo, London.

‡ Proc. Soc. Psychical Research, pt. xxxii. I have to quote from an author's copy, in which the original pagination has been unwisely abandoned by the printer.

§ Trans. Soc. Eng., p. 55.

72, pls. 4, 5), in which the water from a spring is impounded. The water must come from the Lower Greensand.

J. Mansergh referred to a bill promoted by the Croydon Corporation in his address, "The Law and Allocation of Underground Water," at the Engineering Conference of the Institution of Civil Engineers.*

1898.

H. W. Monckton described "some Gravels of the Bagshot District."† This tract includes contiguous parts of Berkshire, of Hampshire, and of Surrey, and is therefore of interest to Surrey geologists.

The presence of large blocks of greywether-sandstone in gravel of Chobham Ridges and of other places is treated of at length, and this is an analogous occurrence to that of the blocks of pudding-stone in gravel around Croydon, the stones in both cases being for the most part the relic of some old Tertiary beds, though the author thinks that some are consolidated gravel.

The Farnham Gravels are also noticed, and are taken to be all River Gravels, although on the Geological Survey map some of the patches are classed simply as Hill Gravel of doubtful age.

The author's conclusion is that there is "no evidence of the presence of the sea in this district during the Drift period," but that there is "ample evidence of ice-action, and this evidence is more or less present in the gravel of all levels," and that the gravel "practically coincides in age with the duration of the Glacial Period."

A. E. Salter's paper, "Pebbly and other Gravels in Southern England,"‡ refers to Surrey, under the headings High Level or Early Drifts (pp. 266, 267); Lower Plateau and Glacial Drifts (pp. 271–274); The River Drifts (pp. 275, 276).

T. Leighton, in an account of an "Excursion to Godalming,"§ continued his work on the Lower Greensand, noting sections of Bargate Stone and Pebble Beds, and of clay. He objects to the Fullers' earth of Nutfield, &c., being classed as Sandgate Beds.

A report of an "Excursion to Kingswood and Walton-on-the-Hill,"‖ describes cuttings on the Chipstead Valley Railway, which show various Drift beds over Thanet Sand and Chalk, as well as a very irregular piped junction of Thanet and Chalk. The gravel of the Heath is also noticed.

A short note of an "Excursion to Upper Warlingham and Worms Heath,"¶ alludes to the Valley Gravel at the former

* Separate copies, not otherwise published.
† Quart. Journ. Geol. Soc., vol. liv, pp. 184–195.
‡ Proc. Geol. Assoc., vol. xv, pt. 7, pp. 264–268.
§ *Ibid.*, pt. 10, pp. 445–450.
‖ *Ibid.*, pp. 456–458.
¶ *Ibid.*, pp. 458, 459.

place, and to the Blackheath Pebble Beds at the latter. The occurrence of allophane here is recorded for the first time.

In "Memoranda chiefly on the Drift Deposits," from the manuscripts of Sir J. Prestwich, there is a reference to sections at Clapham and Wandsworth Commons.*

"The Problem of the Water Supply"† notices a new well at Camberwell, with a section of the beds passed through, which particular well gave occasion to paragraphs in many papers.

In a paper on "New Borings round London,"‡ E. A. Martin notes one Surrey section, which, however, had been already printed in our Transactions. If our members have any new information of this sort, I hope that they will let us have it, or will let me have it, as I have a third paper on Surrey Wells on the stocks.

1899.

In my Presidential Address to the Geological Society, I alluded to some experiments of Dr. Klein on Thanet Sand from Beddington, which show that this sand, as a filtering material, is highly bacteriocidal.§

In his "Analysis of the Genus Micraster,"|| Dr. A. W. Rowe has made a very important contribution to the palæontology of the Chalk, especially from an evolutionary point of view. Although the specimens on which it is based do not come from Surrey, the reasoning is applicable to our Chalk. The object is to show that, "from the zone of *Rhynchonella Cuvieri* to the upper part of the zone of *M. coranguinum*, we can trace an unbroken continuity in the evolution of *Micraster*." All our collectors of Chalk fossils should read this paper.

W. P. D. Stebbing's account of an "Excursion to . . . Walton-on-the-Hill and Betchworth,"¶ gives some further particulars of the new railway cutting (see 1898), and of the pinnacles of chalk that extend up into the Thanet Sand. The Betchworth pit, in Middle and Lower Chalk, is also noticed.

An "Excursion to Reigate," described by Miss Crosfield,** notes a junction of Gault and Lower Greensand, a pit in Upper Greensand, and a deposit with recent species of shells.

A. M. Davies, in treating of "The Base of the Gault in Eastern England," refers to three places in our county.††

* Geol. Mag., dec. iv, vol. v, p 407.
† The London Argus, March 5, p. 389.
‡ Science Gossip, n. ser., vol. v, p. 118.
§ Quart. Journ. Geol. Soc., vol. lv, pp. lxxvi, lxxvii.
|| *Ibid.* pp. 494–547, pls. xxxv–xxxix.
¶ Proc. Geol. Assoc., vol. xvi, pt. 3, pp. 155–157.
** *Ibid.*, pt. 4, p. 162.
†† Geol. Mag., dec. iv, vol. vi, p. 159.

An account of the excursion of 1897, to Redhill, &c., by Miss Crosfield,* gives a detailed section at Frenches sand-pit.

"Holmesdale Towns: A Handbook for Reigate, Redhill, and Neighbouring Districts,"† is undated, which is bad; but a reference to something that has occurred since 1897 inclines one to give it the latest possible date.

If often seems to me a pity that the compilers of such useful books think it incumbent on them to have a chapter on the geology. In the present case, "Geological Features" include pp. 18–30, but three pages of this are taken up with figures utterly ungeologic, and as we are told in the preface that Dr. Mantell's works are the chief authority for the geology, some of this part is naturally somewhat out of date. However, the modern divisions of the Lower Greensand are noted, the Sandgate Beds being hoisted above the Folkestone Beds (a clear case of inversion). No other science is specially treated of, which leads me to wonder when folk will cease to think that any intelligent person can write an account of local geology.

According to the definition of the Valley of Holmesdale that is given, the term Valley is a misnomer; Vale is more correct for such a tract as that, bounded by a certain length of the Chalk escarpment on the north, and a certain length of the Lower Greensand escarpment on the south; which tract is cut by various valleys.

In the past ten years, then, it is clear that much has been done on the geology of Surrey.

The two formations for which most work has been done are the Drift, in the top part of the scale, and the Lower Greensand in the lower part, in our county. This is perhaps owing to there having been more opening for fresh work with these than with other formations; indeed, the literature of the Lower Greensand of Surrey was not very large before the period under review, and many new sections have been made since the publication of the Geological Survey Memoir on the Weald, by Topley. We have greatly to thank Mr. T. Leighton for a renewed interest in the formation which gives rise to the most beautiful scenery of our county. In the case of the later deposits classed as Drift, their wide occurrence of course leads to more frequent notice, and the fact that some of these deposits are connected with the study of the antiquity of our race gives them an additional charm to many observers.

Though so much has been done, I have no hesitation in assuring you that plenty remains to be done, and that Croydon naturalists need fear no dearth of work.

* Proc. Holmesdale Nat. Hist. Club, for 1896–8, pp. 65, 66.

† By T. F. W. Hamilton. 8vo, Reigate, Redhill, and London.

Excursions.

The following excursions have taken place during the past year :—

1st. *April 8th*, 1899.—To Merstham, to visit the new railway cutting. Of this meeting Mr. Robarts sends the following notes :—

"An excursion to Merstham took place on April 8th, when a party of thirteen met under the guidance of the President. The unfavourable meteorological conditions—the day being sleety with strong cold wind—no doubt prevented members from coming in greater numbers.

"The new London, Brighton, and South Coast cutting south of the Merstham tunnel was first visited. The entrance to the cutting was found to be in the gault, which dipped to the north, and consisted of dark sandy clay, with few fossils except foraminifera. The higher beds were of lighter colour, and merged insensibly into Upper Greensand, in which no great way up a considerable bed of fossils was found by Dr. Parsons. This was the more notable, as at an excursion of the Geologists' Association the year before no fossils were seen. Higher up in the series firestone was noted, but the dark greensand at the top of the formation was not visible. Traversing the cutting, one or two faults were noticed, one particularly with a downthrow of about 4 ft.; still more northerly the gault was squeezed up nearly to the surface almost vertically for a few feet.

"The party then went to an old firestone mine east of the northern part of the cutting, which was found to be abandoned, though it was being worked the year before.

"An advance was then made to the chalk-pit, which showed the junction of the Middle and Lower Chalk, the massive beds and the jointing of the former being in strong contrast to the thinner bedding and curved marly fracture of the latter. The junction was marked by a narrow yellowish band, which was probably the Belemnite Marl.

"After inspecting the outside of Merstham Church most of the party took tea at the 'Feathers.'"

2nd. *April 15th.*—To Walton-on-the-Hill, in conjunction with the Geologists' Association, under the guidance of the President. The following Report, prepared by Mr. W. P. D. Stebbing, one of the leaders of the excursion, is taken from the Report of the Geologists' Association :—

"The members reached Kingswood at 2.2 p.m., and walked to the cutting on the western side of the tunnel under Walton Heath, in progress for the Chipstead Valley line. At its south-

eastern end the cutting showed chalk covered with pipes of Thanet Sand, and redeposited Woolwich Clay with flint pebbles; near the working face at the north-western end the Thanet Sand seemed to occur in mass. A point of interest, however, in this cutting was the way in which the chalk had been worn to a series of pinnacles, divided by holes or pipes penetrating almost down to the level of the railway; in some cases the pinnacles rise to within four or five feet of the surface.

"Thence the party walked to the present working face south of the Walton Road Bridge, and to the site of the Walton Station, passing what remained of the section figured below. Returning on the western side of the cutting, the party saw a fairly good section of Thanet Sand with an undulating surface, and two or three pinnacles of chalk standing up in it. On the south side of the Walton Road Bridge, but on the opposite side of the cutting, the strata in the cutting were the same as those previously seen on the north side of the bridge, but the movement that had taken place owing to the destruction of the chalk was more pronounced on account of its occupying less space longitudinally. The Directors pointed out that, though the Thanet Sand was marked in the Drift Edition of the Geological Survey Map as covering a large patch of the surface of the ground about here, at no spot in these cuttings did it reach the surface, except in the case of some pipes at the northern end.

"After tea at Walton Mill the party proceeded to a small sand-pit on Headley Heath, containing sand and a gravel largely composed of flint pebbles. The gravel occurs in isolated patches on high ground from Netley Heath eastwards, and is of uncertain age. Walking southward, the party reached the edge of the North Downs, near Betchworth Clump. Thence they descended to the chalk-pits, which, we believe, had not previously been visited by the Association. Here was seen a section embracing a large part of the Middle and Lower Chalk. The Directors pointed out in descending order; (1) the zone of *Echinoconus subrotundus*, equivalent to the zone of *Terebratulina gracilis*, which does not seem to occur here; (2) the zone of *Rhynchonella cuvieri*, called by the quarrymen 'Burr Chalk,' and equivalent to the Melbourn Rock; (3) the zone of *Belemnitella plena*, a very distinct narrow band round the quarry, and forming the top of the Lower Chalk; and (4) the zone of *Holaster subglobosus*. The distinction between zones 1 and 2 was very easily seen on one side of the pit. The marked difference in character between the massive thickly-bedded Middle Chalk and the more thinly-bedded and marly Lower Chalk was well seen."

3rd. *May 6th.*—To Tilburstow chert-pits. The object of this excursion was to see the long line of pits on the dip-slope, dug

for the purpose of getting at the chert-beds of the Lower Greensand for road-metal. To do this a large amount of overlying loamy beds has to be removed, sometimes to a thickness of from twenty to thirty feet. At one part still higher beds of sand are touched, and a small landslip has occurred, through water being thrown out from the more permeable beds above by the less permeable mass below. Fossils occur in the Lower Greensand here, and the chert yields sponge-spicules.

The section has been described in various papers, or accounts of excursions, some of which are noticed in the President's Address.

4th. *May* 13*th*.—To Gatton Hall, conducted by Mr. Pierce (a cycling excursion).

5th. *May* 22*nd* (Whit Monday).—To Forest Row and Crowborough, conducted by Mr. J. H. Baldock.

6th. *June* 3*rd*.—Geological Excursion to Redhill and Reigate, in conjunction with the Geologists' Association. The following Report, prepared by Miss M. C. Crosfield, is taken from the 'Proceedings' of the Geologists' Association:—

"The party met at Reigate Station about 2.30 p.m., and first visited a sand-pit in the Croydon Road, where the junction of the Gault and Lower Greensand is well seen. Phosphatic nodules and fragments of wood were found, but no fossils. Crossing the Gault on Wray Common, the company walked westward by Raglan Road, at the foot of the Upper Greensand escarpment, and thence to a pit in Upper Greensand just below Colley Hill, where the following section is exposed:—At the top—chloritic marl, 7 ft. 6 in.; cherty band, 6 in.; hearthstone, 6 ft.; cherty band, 6 in.; hearthstone, 5 to 6 ft.; fire- and building-stone, 6 ft. Sponge spicules occur abundantly in the cherty bands. Two small faults were distinctly visible. In the 'Horseshoe' quarry (450 ft. O.D.) adjoining, Mr. George Taylor, on whose property the Association was now assembled, met the party. He stated that the tunnels recently discovered in the hill were two hundred years old. From borings made for water he found that the thickness of the Upper Greensand here was about 55 ft. After a vote of thanks had been passed to Mr. Taylor, the Rev. R. Ashington Bullen described the Holocene deposit in the same quarry. It is 4 ft. thick, and yielded *Bulimus montanus*, *Helicigona arbustorum*, and *Clausilia rolphii*, no longer extant there. *Terebratulina gracilis* from the Middle Chalk, and an abnormal facetted nodule (hydrated MnO), probably from the Upper Greensand, occurred. The abundance of

Arion ater (granules) and *Carychium minimum* at 2 to 3 ft. levels attest moister conditions than now obtain.* A Neolithic scraper occurred at a depth of 2½ ft. A few of the members scaled Colley Hill to see a block of ferruginous conglomerate, measuring 46 in. × 40 in. × 24 in. Mr. H. W. Monckton considers this mass of cemented angular and rounded pebbles to be a relic of a deposit of sand, &c., similar to that which has been mapped at Chipstead, 2½ miles north-east, and to a larger patch at Headley Heath, 2½ miles north-west from the site of the block under discussion. Unfortunately this conclusion does not carry us very far, for the deposit is mapped and described as 'Sands of Doubtful Age.'† A visit was then paid to the Reigate Hill pit in Lower and Middle Chalk."

7th. *June* 17*th.*—To Godstone and Oxted, led by Dr. Franklin Parsons.

"On June 17th an excursion, under the leadership of Dr. Parsons, took place to Godstone and Tandridge. From Caterham Station the party proceeded by road to Godstone Hill, from the top of which a fine view over the Weald is obtained. In some old overgrown chalk-pits and spoil-heaps a number of interesting plants were observed, including several species of Orchidaceæ; also the great Roman snail, *Helix pomatia.* Descending the hill, a visit was paid to the firestone quarries (Upper Greensand), which some of the party explored. These quarries are tunnels extending a distance of some three hundred yards into the hillside, the farther end having a cover of some 230 ft. of strata. The party then went by way of Flower Lane, passing other quarries, a Roman road, and the track of the Pilgrim's Way, to Godstone Church, where a halt was made for tea. Afterwards the ponds were visited, and the picturesque mill with its overshot water-wheel. From the mill a path led through woods and hop-fields to Tandridge Church, with its quaint dormer windows and splendid yew-tree, and thence on across meadows to Oxted, whence a return was made by train."

8th. *June* 24*th.*—To Charlton—a Geological Excursion in conjunction with the Essex Field Club, conducted by Dr. Franklin Parsons, who sends the following Report:—

"The chief interest of the excursion was geological, its objective being a large sand-pit about half a mile east of the station, permission to visit this pit having been kindly given by the proprietor, Mr. Gilbert. This pit is at the north-west corner of a grassy hill commanding a fine view of the Thames. On the flat

* Proc. Malacological Soc. vol. iii.

† Whitaker, "Geology of the London Basin." Mem. Geological Survey, vol. iv, p. 336 (1872).

summit of this hill are the remains of an ancient (? Roman) camp, but the entrenchments have been much encroached on and destroyed by the excavations which have been subsequently made on the sides of the hill. This is especially the case on the east side, where the wall of the camp has been entirely destroyed by a very large excavation, now disused and converted into a recreation ground for Woolwich. The numerous large excavations, now mostly disused, which exist along the ridge of hill overlooking the Thames, were made in former times, chiefly for the purpose of digging sand and gravel as ballast for ships returning to the Tyne and other northern ports after having brought cargoes of coal to London. The digging of sand and gravel for this purpose has now been superseded by the use of water ballast. Mr. Gilbert's pit is worked chiefly for the purpose of obtaining moulding sand for foundry use. It exhibits a fine section of the strata from the Oldhaven Pebble beds to the Upper Chalk inclusive. The Upper Chalk is seen in the bottom of the pit, and a few specimens of *Inoceramus* and the commoner sea-urchins were obtained from it. At the junction of the chalk with the superjacent Thanet Sand is a bed of green-coated unworn flints. This bed ranges in thickness from 6 to 18 in. or more, being thicker where it fills up hollows in the surface of the chalk beneath. Above this is the Thanet Sand, for which the pit is worked. This bed is some 30 to 40 ft. thick. The lowermost portion, 7 ft. thick, and locally called 'blackfoot,' is of a somewhat loamy nature, and is valuable for moulds for brass castings. The next twelve feet above this consist of larger-grained and less cohesive sand, better adapted for mould for iron castings. The upper part of the Thanet Sand is a sharp white sand. In the lower part of the pit a pocket was observed in the sand containing a current-bedded infilling with clayey partings. Above the Thanet Sand, and separated from it by a pebble layer, come the Woolwich Beds, some 20 ft. in thickness; these consist of an alternating series of sands with ferruginous concretions, shelly clays, and pebble beds. These beds dip and thin out to the west on the slope of the hill on that side, this being due to their having slid down the hill and become thereby drawn out. At the top of the pit the Oldhaven pebble beds are seen.

"The shelly clays of the Woolwich Series, and the Oldhaven pebble beds, are, however, better seen on the steep face at the east side of the hill, where they abound in fossil shells. These are mostly in fragments, but by careful search good specimens may be found. The most plentiful fossils in the Woolwich Beds are two species of *Cyrena* (*C. cordata* and *C. cuneiformis*), and the turreted gasteropod, *Melania inquinata;* another similar shell, *Cerithium funatum;* and a large species of oyster (*O. bellovacina*)

are also found. The Oldhaven Beds yield the same species, and some others, as *Pectunculus plumsteadensis*, and the gasteropods *Melanopsis*, *Neritina*, and *Buccinum*."

9th. *July* 1*st*.—To the outlier of the Blackheath pebble-beds at Worms Heath. In the large pit on the south-western side of the heath these beds are of a somewhat exceptional character, being largely of a bright crimson, from the occurrence of iron-oxide, and often cemented into huge blocks by the iron-oxide. There are signs too of their having been partly let down into a pipe or hollow in the chalk beneath. The rather rare but by no means beautiful mineral, allophane (a hydro-silicate of alumina) was found here by the President a short time before, and plenty of small pieces were now got in sandy and loamy beds beneath the pebbles. This is the only recorded locality in the county. Above the pebble-beds is some irregular gravel, chiefly composed of flints, but little worn, and in places between this and the pebble-beds is a little fine sand, with some green-coated flints and pieces of allophane. The green-coated flints presumably come from the base of the Thanet Sand, and probably the sand is a mass of that formation, which has slipped over, or has been carried over the pebble-beds from some former high land; its proper place being, of course, beneath them, and next above the chalk.

10th. *July* 15*th*.— To Coulsdon, Chaldon, White Hill, and Caterham. Conducted by Mr. A. J. Hogg.

"An excursion was conducted by Mr. A. J. Hogg from Coulsdon to Caterham. About twenty-five members attended, and, leaving Coulsdon Station, ascended to the broad elevated chalk ridge of Farthing Down, some 480 ft. above O.D. At nearly the highest point the remains of several British tumuli were observed, and the turf was gay with patches of *Polygala*, *Spiræa*, *Campanula*, &c. After some pleasant loitering, the party proceeded through a shady lane, a mile or so in length, to the ancient church at Chaldon. Here a prolonged stay was made for the purpose of inspecting and photographing the curious painting of the 'Ladder of Salvation,' supposed to date from the twelfth century, which covers one wall of the little building. The picture is a graphic representation of the infernal regions as they existed in the imagination of the enlightened artist.

"Leaving the church, which stands at 550 ft. above sea-level, an uphill road led to Hill-top Farm (600 ft.), and, turning in here, the Pilgrim's Way was soon entered, and the wayfarers were charmed with the great variety and beauty of the wild flowers, as well as by the diversified and extensive views of the

weald valley from different points of vantage, at heights of 700 ft. and upwards. The gravel-pit on Willey Farm was next visited, and the geological members were favoured by Mr. Whitaker with an explanation of the sections exposed of the Upper Chalk, with several interesting sand-pipes. The walk was extended, after a long and steep descent of the chalk escarpment, across the intervening valley to White Hill (700 ft.), a cliff composed of Upper Greensand beds, which, gleaming white in the sunshine, forms a conspicuous object in the landscape. The large Roman snail, *Helix pomatia*, abounds here, with other scarce molluscs; but, owing to the long continued dry weather, few examples were met with.

"A couple of miles farther by hill, dale, and road, and the descent was made by the pretty little Hare Valley into Caterham, where tea at the comfortable 'Railway Hotel' refreshed the tired pedestrians before the return journey to Croydon."

11th. *August 7th* (Bank Holiday).—To Leith Hill. Conducted by Mr. Townend.

12th. *September 16th.*—A Fungus Hunt. Conducted by Dr. Franklin Parsons.

"A fungus-hunt was made at Shirley Hills, under the guidance of Dr. Parsons, but with somewhat indifferent success, owing to the dryness of the season. About a dozen kinds were found, and were exhibited at the meeting on Sept. 19th."

Evening Meetings.

February 21st, 1899.—The paper of the evening was "On the Commons near Croydon, and their Flora," by Dr. H. F. Parsons. (See Trans., art. 144.)

March 21st.—At this meeting Mr. Edward Lovett delivered an address on "Primeval Commerce and the Evolution of Coinage."

Mr. Lovett began by saying that man had always been an acquisitive animal, and that decided evidence of commercial barter had been found in relics of the Stone age. Certain stone of great value for implements was undoubtedly traded with early races who desired to obtain that stone, much in the same way that certain South Pacific islanders even now barter the special kind of shell fish-hooks they manufacture with the natives of other islands. As civilization advanced this commerce by simple barter became very troublesome, and so we find that certain articles became standards of value by which other productions were assessed, so to speak. These standards then became symbolized, as we find in the slabs of metal bearing the effigy of

an ox, the ox being one of the most universal standards of value, and is so now in South Africa. In Central Africa hoes, and in China knives, have been modelled as currency in lieu of the real article. As it was necessary that currency should be difficult to copy or forge, it naturally followed that metals soon attracted attention, and we find bars of copper doing duty as currency. As an additional precaution these bars (and sections of them) were officially stamped; hence we get the first coin. Later again these rough lumps were neatly rounded, and made gradually shapely, until we arrive at the *true* coin, still bearing in many instances the effigy of the object it symbolized. The use of gold and silver was another proof of the anxiety to construct a currency that could not be debased by fraud.

This paper, which was of considerable length, was published in the 'Bankers' Magazine' for May, 1899.

April 18*th.*—Mr. R. J. Hinton read an address on "Some Wonders of Bee Life," in which he gave a very interesting account of the anatomy, physiology, and life-history of the bee, illustrated by diagrams and specimens.

May 16*th.*—"On Deep-sea Deposits obtained by the 'Challenger' and other Scientific Expeditions," by W. Murton Holmes.

The lecturer said that the history of deep-sea exploration was of quite recent origin. Previously to 1864 it was the general opinion among men of science that life did not, and could not, exist below a certain depth of the sea. There were, according to Edward Forbes, fixed zones of depth:—(1) the Littoral Zone between low and high water marks; (2) the Laminarian Zone, from low water to a depth of fifteen fathoms; (3) the Coralline Zone, from the fifteen-fathom line to a depth of fifty fathoms; and (4) the Zone of Deep-sea Corals, extending from the edge of the Coralline Zone to an unknown lower limit. "In this region," he says, "as we descend deeper and deeper, its inhabitants become more and more modified, and fewer and fewer, indicating our approach towards an abyss where life is either extinguished, or exhibits but a few sparks to mark its lingering existence."

In 1864 a crinoid, or lily-star (*Rhizocrinus lofotensis*) was discovered by G. O. Sars off Norway in water 700 ft. deep, and abundance of animal life was procured in further dredging operations in depths of from 700 to 800 ft. This discovery led to the fitting out of surveying ships with improved apparatus. Among these were the 'Lightning,' which surveyed the North Atlantic Ocean in 1868, and the 'Porcupine,' which made surveys off the West Coast of Ireland and in the Bay of Biscay

in 1869, and again the following year between Falmouth and the Mediterranean.

So much interest was felt in the bearings in the new discoveries upon important biological, geological, and physical problems that, on the representations of the Royal Society, the Government fitted up the 'Challenger' in 1872 for the purpose of investigating each of the great oceans, and to take an outline survey of that new field of research, the bottom of the sea.

The scientific results of this survey were very important, and a series of valuable reports was published, which filled fifty large volumes, beautifully illustrated. These reports were not completed until 1895. Our knowledge of deep-sea forms may be said to have commenced from the publication of these reports.

The lecturer next described some of the groups of deep-sea life, which were illustrated by micro-photographs taken from nature. Foraminifera were described as belonging to the lowest class of animal life, the Protozoa. They consist of a mass of structureless jelly-like protoplasm, which is capable of emitting long thread-like processes which entangle particles of food from the surrounding water, and by a streaming movement of the protoplasm conveys this food to the central body. In most cases the main portion is enveloped by a calcareous shell perforated with holes, through which the delicate filaments are protruded. The majority of species live at the bottom of the sea; others are pelagic, and occur in abundance at the surface.

The most abundant genus is Globigerina. It occurs in immense numbers, forming what is known as Globigerina Ooze, mostly at depths of from 600 to 2500 fathoms in the Atlantic, Western Indian Ocean, and Pacific, and the total area covered by its remains is estimated by Murray and Renard at 49,520,000 square miles. Radiolaria are distinguished from the Foraminifera by the presence of a siliceous or a horny, in place of a calcareous skeleton, and by the presence of a membranous central capsule surrounding a nucleus. They are commonly floating organisms, and are often present in enormous numbers in all seas, the greatest variety of species, however, being found in the warm waters of the tropics. Their remains constitute Radiolarian Ooze, which is found principally at depths of from 2000 to over 4000 fathoms, and are estimated to cover 2,290,400 square miles. About 4000 species have been described.

Pteropods also form an ooze of a more limited extent (400,000 square miles), especially between Cuba and Florida Keys. Pteropods, or 'winged snails,' are pelagic molluscs found swimming near the surface of the sea, and are all of small size. They have no distinct head, and the mouth is placed in the fore part of the foot, which is rudimentary. The lateral parts of the foot are, however, developed into a pair of wing-like fins by means of

which the animal swims actively. The shell is generally calcareous, and very delicate in texture, frequently taking the form of a slender hollow cone. Pteropod ooze is not found below 1500 fathoms, the carbonic acid in the water dissolving the delicate shells. For the same reason Globigerina ooze disappears below 2500 fathoms, the shell being somewhat thicker.

Sponges. — The simplest form of sponge consists of a thin-walled sac with the walls perforated by pores, and the central cavity lined by flagellated cells. The constant vibration of these flagellated cells gives rise to a strong current of water, which is drawn through the pores into the central cavity, and passes out through the mouth of the sac. About 2000 species are known, and 300 are found round the British coast. They may be either soft, stony, leathery, or horny, and vary in weight from one grain to over one hundred pounds. The more complicated forms are built up of a number of cells supported on a framework either of horny fibres or of siliceous or calcareous spicules. The skeletons of the siliceous species form extensive deposits in deep water. They are divided into four orders :— (1) Monaxonida, with one-rayed spicules; (2) Tetractinellida, with spicules of four rays ; (3) Lithistida, which are massive and stony sponges, with interlocking spicules ; (4) Hexactinellida, with six-rayed spicules. The calcareous and horny sponges form separate groups—the Calcarea and Keratosa.

Diatoms are one-celled plants, belonging to the Algæ, inhabiting both fresh and sea water. The cell-wall is hardened by the deposition of silica, so as to give rise to a glassy case, known as the frustule, composed of two parts which fit into one another like the lid of a pill-box. The cells may be either separate or connected into filaments, either free or attached to some other body. The separate valves are of various forms, and their surfaces exhibit more or less delicate sculpturings and markings, or they present a cellular appearance like honeycomb. The accumulation of these flinty envelopes gives rise to very extensive deposits, more especially in the Arctic and Antarctic regions, the total of which has been estimated at 10,880,000 square miles.

Minute bodies known as Coccoliths and Rhabdoliths are to be met with in nearly all deep-sea deposits. Coccoliths are oval calcareous discs, having a thick strongly refracting rim and centre, and are the disintegrated remains of a spherical body known as a coccosphere. Rhabdoliths consist of minute calcareous rods, having a disc at one end, and are the disintegrated remains of a body called a rhabdosphere. Coccospheres and rhabdospheres are now regarded as pelagic Algæ.

From a depth of 2000 fathoms downwards there is a widespread deposit of red and grey clays, the area of which is estimated at 51,500,000 square miles. These consist of silicate of

alumina with the oxides of iron and manganese. They result from the decomposition of pumice and volcanic dust, either from terrestrial or submarine volcanoes.

The extreme slowness of deposition is shown by the fact that the 'Challenger' frequently procured in a single haul hundreds of sharks' teeth, some of them of gigantic size, and occasionally embedded in manganese; dozens of ear-bones and other bones of whales, large numbers of manganese nodules, zeolites, and magnetic spherules, which are believed to be the dust of meteorites, which in the course of long ages have fallen upon the sea. Sharks and whales could never have been so numerous at one time that their remains should form a continuous stratum. Many generations would therefore be represented.

The lecturer then compared chalk with Globigerina ooze, and also exhibited sponge spicules contained in the Greensand, and various specimens of Radiolarian earth which were comparable with Radiolarian ooze.

September 19*th.*—This meeting was devoted to the exhibition of specimens of interest, with brief descriptions of them.

October 17*th.*—"On the Leonid Showers," by James Edmund Clark, B.A., B.Sc., largely illustrated by lantern slides:—

A meteor, in brief, is a minute particle of matter permeating the whole of space, subject to the same laws of gravity as our own earth. Like her, it is temporarily, at any rate, moving in an orbit round the sun with astronomical velocity measured by miles per second. The two orbits happen to intersect: the two bodies happen to come at the same instant to the point of intersection, though the earth shifts its place by its own diameter every seven minutes. Most likely the meteor has been voyaging for the better part of a million years, since its last visit to us and the sun, and only for five minutes of this million years is it in danger of collision with the earth. And yet the collision comes. High up in the atmosphere the meteor, about the size of a mustard seed, and weighing at most, perhaps, a couple of grains, burns in an instant or two to impalpable dust. During this time it has traversed thirty to fifty miles, through atmosphere attenuated to almost an inconceivable degree. At the end it is rarely within thirty-five miles of the surface, and the air-pressure is still but one-thousandth of that at sea-level, or enough to raise the mercury in a barometer about $\frac{1}{35}$ of an inch in place of 30 inches. This pressure is less than the best vacuum from an ordinary air-pump. Most meteors vanish when still fifty miles high, having appeared at about seventy-five miles. At fifty miles the air is five hundred times rarer still; at seventy-five the pressure is less than one-hundred-millionth

that at the sea-level. And yet this little grain is glowing with an intensity which makes it visible more than a hundred miles away. This is simply from the intense friction against the infinitesimal amount of air. It is accounted for by its prodigious velocity, which would take it from over Edinburgh to over London in a quarter of a minute. There is no time for the air to get out of the way, Air is heated by compression, as we all now know from our bicycle pumps. In front of our meteor it reaches an ultra-white heat, which almost instantly consumes the solid particles.

A shooting star, consequently, can never reach the ground. But from time to time far larger bodies appear, rivalling the brilliance of the moon or electric lights. These penetrate far further, and occasionally very large ones actually fall. Assuming them to be, as it were, boulders of the same nature as the sand grains which vanish overhead, we learn from them that meteoric matter often consists of nearly pure nickel-iron, but more often of a stony substance, usually rich in grains of iron, and most like some igneous rocks. No new elements have been found in them, but some of their mineral combinations are otherwise unknown on the earth.

If the paths of the meteors seen on a given night are noted, it will be found that most of them point backwards to the same position among the stars. This place is accordingly called their radiant. This was noted in 1833; but observations of Mr. G. J. Symons in 1860 first brought attention to its significance. Thus, on April 20th meteors radiate from a point near Vega, in the constellation Lyra. They are therefore called the *Lyrids*. In early August a few go out from the Square of Pegasus, but more, especially on the 9th and 10th, from Perseus. Thus we get the *Pegasids* and *Perseids*. The latter may be counted at the rate of thirty to fifty in the hour, instead of the usual average of four or five. We therefore speak of a "shower" of Perseid meteors. This name is more appropriate to the Andromeda shower, a display first seen on November 27th, 1872, again in 1885, and possibly recurring in the early evening of November 27th of this year.

But the mid-November shower, the meteors of which, radiating from the sickle of Leo, give the name in our title, pre-eminently form a meteor shower. In August it is surprising if one is seen every minute, and yet they are under one common bond, each and all pursuing the same orbit with such unerring exactitude that it cuts our own every August without fail. Nevertheless the members of the group are as far from each other, as a rule, as London and New York. Their speed, compared to our earth, is forty miles per second. Even if one were seen each minute nearly in line with its predecessor, it would

be actually 2,400 miles in the rear. As a fact they rarely come so close.

The grand Leonid shower of 1866 came just when astronomers were sufficiently advanced in meteoric study to avail themselves of its lessons. The previous display in 1833 had suggested to some that meteors bore a certain resemblance to comets, but the full consequences were not immediately grasped. Foremost, perhaps, was the now obvious meaning of their radiating from one point. Plainly it was the result of perspective upon a number of bodies whose actual paths were parallel. Therefore they were moving together; that is, they were all describing the same orbit round the sun. This orbit was quickly calculated, and almost at once came the startling announcement that it was identical with that of a comet seen earlier in the year.

Comets, then, and some meteors were of common origin. For, when once set on the right track, other meteor displays, notably that of August, were also found to be so connected. The fact was, of course, disputed, but in 1872 it was finally set at rest in the most convincing manner. Biela's comet was then expected, the comet which astonished everyone in 1845 by splitting into two. Since its next return, in 1852, it had been lost to sight, but in 1872 the return was very favourable, as it was due not far away when our earth came near its orbit on November 27th. Astronomers searched in vain, but early that night there was a remarkable display of meteors of rather diminutive size. Calculations quickly showed that they belonged to the Biela system. It is now held that the head of a comet consists of multitudes of these meteoric particles, the light being partly caused by their incessant collisions. A further result is that many are constantly dropping behind or getting in front, but still follow on in the comet's orbit. The attraction of the earth and other planets is another, perhaps more potent, cause. Thus meteors arise from the comet's *trail*—an entirely distinct affair from the still mysterious *tail*.

Whence, we may ask, do the comets come which supply our meteors? Casual visitors from infinity, say some. Eruptive matter from the sun, say others. It is possible that both these ways have helped in the work, but the main source is yet more interesting, namely, the outermost fringe of our own solar system. This is deduced upon two grounds. Nearly all move, as said, at twenty-six miles per second. Their orbits, too, are practically parabolic. This means that they probably are reaching the sun for the first time, or else move in ellipses, whose centres lie further away even than Neptune. Had they come from yet remoter stellar regions, they would have a higher velocity and hyperbolic orbits.

Unless a comet passes very near us, the Earth does not

materially change the comet's course, but with our four big brothers—Jupiter, Saturn, Neptune, and Uranus—the case is different. Their distance from the sun adds to the effect of their enormous mass in two ways. It increases their power relative to the sun, and the comets pass them at speeds only fractions of their twenty-six miles per second past us. The consequence is that they each have their special band of captives. These are easily recognised by their orbits having been shortened down in space and time. Jupiter's captives go at most a little further from the sun than himself, and take only eight years or less to revolve. Among them is Biela's comet, which gives us the Andromedes, cutting our orbit every $6\frac{2}{3}$ years. The Perseids belong to Tuttle's comet, a captive of Neptune; while the Leonids follow Temple's comet, slave to Uranus, due next year and every $33\frac{1}{4}$ years following. This comet is believed, as stated, to have been captured in 126 A.D. By 902 its orbit was so shifted as to cut ours. The main body of the comet's trail collided with us on October 19th (N.S.), and has continued to do so ever since. The day may come when another encounter with Uranus will switch it off again to the depths of space. But the main body of meteors would remain. Planetary action induces an advancing date in the Leonid shower, as shown by the subjoined table of records:—

A.D.			
902,	10 mo.	19th	..... The Arabic 'Year of Stars.'
934,	,,	20th	..... 'Signs in the heavens as stars falling.'
1002,	,,	21st	..... 'Thousands of small stars.'
1101,	,,	24th	..... 'Stars were seen to fall from heaven.'
1202,	,,	26th	..... 'Towards daybreak thousands of shooting stars . . . flew about like grasshoppers.'
1366,	,,	30th	..... 'Such numbers that the sky and air seemed to be in flames.'
1533,	11mo.	3rd	..... 'Many thousand stars . . . fall and dash together.'
1602,	,,	6th	..... 'Many hundred . . . in the same direction.'
1698,	,,	9th	..... Seen at Geneva.
1766,	,,	9th	..... In South America.
1799,	,,	12th	..... Greenland to South America.
1833,	,,	13th	..... North America.
1866,	,,	13th	..... Europe (morning of 14th).

This table tells us plainly that the shower may be expected about the years '33, '66, and '99 of each century, and has now been so recorded without any break for four times in succession. At its last appearance it was foretold as probable. Certainty of observation cannot be assured for two reasons. The stream, though so compact as to give only one chief display per revolu-

tion, may yet not be continuous, and the Earth may slip in between. Also, the meteors may last barely a couple of hours, and so only a quarter or less of the Earth (over a segment the shape of a melon slice) be favoured. Clouds, too, have to be reckoned with. This year, also, the Moon, nearly full, will seriously interfere with the spectacular effect.

Mr. Clark gave a vivid description of the great display of November 14th, 1866, which he witnessed as a schoolboy at York. Diagrams of this display, prepared by him at the time, were shown upon the screen.

November 21*st*.—"On the Evolution of Form and Design in Art," by Edward Lovett.

Mr. Lovett began by dealing with the work of man of the Stone Age, showing how all his ideas as to form and design were in all probability suggested to him by some natural object—the fish-hook being originally a thorn from a bush (for instance); indeed, such hooks actually survive to this day. Pottery, with all its modern beauties, may be traced back step by step to the clay-covered gourd fashioned and baked by primæval man.

In decorative art, a great deal of apparently meaningless design is simply a gradual differentiation from a useful and necessary part of the object. A simple illustration of this consists of the blue lines of a modern registered letter, which represent the ligature by which such letters were once tied up.

The lecturer then exhibited a series of thirteen sketches, each of which had been copied from its predecessor by different artists.

The original design was from a Japanese design of a pair of birds flying; and Mr. Lovett showed that, after thirteen artists had given their individual ideas to the subject, it became absolutely unlike the original. So it is, and has always been, with the perpetuation of any antique form of decoration; it becomes so changed from the original as to be quite difficult of identification.

Mr. Lovett then proceeded to describe many examples of copying the human face in art, and the way in which it becomes conventionalized by the multiplication of certain parts. The lecture dealt very fully with many other phases of this subject, which was illustrated by a large collection of aboriginal art specimens.

December 12*th*.—Was devoted to a lecture by Mr. F. Enock on the "Wonders and Romance of Insect Life." This lecture was kindly arranged for by our Vice-President, Mr. Philip Crowley.

January 16*th*, 1900.—The Annual Meeting and President's Address.

February 20th.—"The Report of the Meteorological Sub-Committee for 1899," by Mr. F. Campbell-Bayard, President of the Royal Meteorological Society (Trans., Art. 145). Also a "Report on Ground Temperatures during 1899," by Dr. H. F. Parsons (Trans., Art. 146).

The following Reports have been received from the various Sub-Committees:—

Geological Committee.

The Geological Committee have to report that during the year they have held eight Committee and Sectional Meetings, whilst some of the Club's Conversational Meetings have been upon Geological subjects, under the superintendence of your Committee.

The Section has also had four Excursions (see *ante*).

By the co-operation of the Photographic Sub-Committee, several photographs of geological interest have been secured for the Album presented to your Committee by Mr. Harry D. Gower.

Duplicates of these photographs will be sent to the British Association Committee on Geological Photographs whenever considered desirable.

In accordance with an arrangement made with the Museum Sub-Committee, steps have been taken by this Committee to secure geological specimens on loan, for exhibition in the Club's Loan Museum at the Town Hall.

Dr. H. Franklin Parsons and Mr. N. F. Robarts have superintended the selection of specimens, which now number upwards of two hundred, lent by the following gentlemen, to whom the Committee tender their warmest thanks:—Messrs. W. B. Bannerman, Thos. Brockbank, George Clinch, Noel E. Corry, Dr. G. J. Hinde, W. Murton Holmes, A. J. Hogg, H. T. Mennell, E. W. Moore, Dr. H. Franklin Parsons, A. J. Potter, —. Paget, N. F. Robarts, A. E. Salter, W. P. D. Stebbing, W. W. Topley, W. Whitaker, and C. H. Williams.

Your Committee are also much indebted to Mr. W. Murton Holmes for providing labels for the specimens.

The object of your Committee in arranging their portion of the Museum has so far been to exhibit fossils from localities within twenty miles of Croydon, on the south side of the Thames, with specimens illustrative of the rocks and minerals obtainable in the above district, and a series of specimens illustrative of the rocks composing the Croydon Gravels.

Specimens of Flint Implements from the district have also been placed in the Museum.—N. F. Robarts, *Hon. Sec.*

Photographic Sub-Committee.

During 1899 the Photographic Section have held their usual weekly meetings, at many of which very interesting papers have been read.

The most notable papers were on the Photography of Flowers, by Mr. H. T. Malby, F.R.P.S.; on Outdoor Work with the Camera, by the Rev. A. H. Blake; and Mr. A. P. Hoole's lecture on lantern-slide making.

Among other successful meetings were Mr. Sandell's exhibition of

lantern-slides of Italian Cathedrals and of the Halls of the City Companies; Mr. Hoole's lantern-lecture on the Norfolk Broads and the Channel Islands; the Exhibition of Geological lantern-slides, lent by the British Association, and described by the President; and Mr. Crowley's exhibition of lantern-slides of places in Italy, including some striking views of Vesuvius and of Pompeii.

At the Soirée a good collection of over eighty pictures was shown.

Mr. Saville-Kent showed a collection of beautiful lantern-slides in natural colours, made by Mr. Sanger-Shepherd's new system of trichromatic photography.

A collection of members' slides was also shown.—E. Pierce, *Hon. Sec.*

Anthropological Sub-Committee.

The Sub-Committee continue to make notes upon Folk-lore and kindred subjects, which may be regarded as belonging to the locality. Four of these are given herewith; and it is to be hoped that members and their friends will bring before my notice any points of interest they may observe connected with our subject—such, for instance, as the survival of ancient customs, old superstitions and sayings, the use of primitive implements and appliances, as well as authentic records of prehistoric stone and flint implements.

During the year several exhibits have been made at the ordinary meetings, of objects of general Ethnographical interest, and two papers have been read, one on Primitive Commerce and the Evolution of Coinage, and the other on the Evolution of Form and Design in Art.—Ed. Lovett, *Hon. Sec.*

Implementiferous Gravels of Surrey.—Although worked flints of undoubted human chipping have been found in the marly gravel beds of Wandsworth, and also in those of Mitcham, I have never yet succeeded in finding even the slightest indication of such work in our Croydon "Fairfield" Gravels. The patchy gravel beds in the Brighton Road, too, which are probably of the same age, have, so far as I am aware, yielded no evidence of the work of Stone-age Man. I am inclined to think that these gravels are of greater age than the gravels of Wandsworth and Mitcham. As regards the Purley Gravels, in or near to which the mammoth tusks were found, I could not trace, nor have I heard of any trace of flints bearing evidence of human workmanship being observed there.—Edward Lovett.

During the last two or three years a considerable number of flint implements and flakes have been found in part of Beddington Park; in form and in texture of the flint they much resemble specimens from the Thames at Wandsworth, Putney, and Mortlake; the flint is in most cases clear, translucent, and brownish, and shows no trace of patina discolouration or decomposition on the surface, thus differing much from specimens from the South Downs, in which, while the centre is of black opaque flints, the surface to a depth of one-sixteenth of an inch or so is white, apparently caused by a dissolving away of soluble portions of the silica, as the white portion shows a porous structure. The Beddington flints are found in a plantation, extending down to the Wandle, and on sloping ground close to springs. The situation is exactly such as would be chosen by a primitive people for a camp or settlement. The site has always formed part of the parks,

and no doubt under the undisturbed turf of the park adjoining abundance of other specimens exist, as it is in such positions we must look for the traces of the early settlements, which were the primitive forerunners of the villages which now exist along the line of the springs rising from the chalk. Photographs of some of the flints will be sent to the Scientific Portfolio.—H. C. Collyer.

Surrey Rush Clips.—The Rush Clip is an appliance of iron of the rough and ready blacksmith's kind; like an inverted pair of pincers on a stand, and carrying a douser or extinguisher. They were certainly used as far back as the thirteenth century, and probably all over Europe; they may be even older. They have, curiously enough, survived in Surrey as late as 1862, though they are undoubtedly extinct now. I was recently talking to a man who was a Surrey farm hand in the early sixties. He fully described the method of using a Rush Clip, and how they gathered the rushes from the water-side, dried them, peeled two strips of the cuticle off, and then soaked the rush in hot mutton fat. When cold the rush was practically a taper; and he told me how the farmer's wife cut off a certain length, and no more, for a light to light the men to bed. This took place, he assured me, in 1861–2. As I pretended absolute ignorance on the subject, and as the man gave me a very practical object-lesson in how a Rush Clip is worked, I feel sure that he really had actually used them. This was near Horley.—Edward Lovett.

May Day Survival in Croydon.—The observance of this ancient Scandinavian celebration of the advent of summer and tree worship is, unfortunately, rapidly disappearing before the advance of our practical and matter-of-fact view of life. The Maypole is almost extinct, except in a forced and unnatural sort of way; and the "Jack in the Green," with its quaint mixture of incongruities, has now become a thing of the past. On May 1st, 1899, I saw in Croydon what may be regarded as a poor survival of a former great occasion. A group of small boys carried, suspended from a horizontal bar some five feet long, a sort of globular cage made of the branches of trees, the whole being decorated with flowers and bits of coloured paper (the diameter of this cage was about eighteen inches). Inside the cage was fixed a gaily dressed doll—the whole representing the Queen of the May in her bower. Another boy carried a sort of sceptre, consisting of a piece of wood elaborately decorated with flowers and paper in a spiral. This was a devoluted Maypole, which was, in its days, the Tree God, with its offerings and gifts (*vide* also the Christmas Tree, which is a Scandinavian myth too). The children referred to sang some meaningless verses, doubtless a devolution from a song of thankfulness. I questioned them as to why they did this and what they knew of it, and found that they knew nothing at all about it, and that they did it because others had done so before them, and—there was money in it!—Edward Lovett.

Members elected, 1899.

February 21*st.*—George Henderson, St. Katharines, Oxted.

March 21*st.*—E. A. Martin, 69, Bensham Manor Road, Thornton Heath. E. Alexander, Grasmere, Birdhurst Road. A. Hall, Stanton House, 16, Park Hill Rise. Mr. & Mrs. Marten Sells, Lodore, Campden Road.

May 16*th.*—A. H. Smee, J.P., The Grange, Wallington. A. E. Bradley, Appleshaw, Friends' Road, Croydon. Stephen Campbell Bayard, Cotswold, Wallington. Geo. Clinch, 22, Nicholson's Road, Croydon.

September 19*th.*—Ernest Alfred Smedley, M.A., B.Sc., 173, Albert Road, East Croydon. Ebenezer Topley, Ingleside, St. Augustine's Avenue, South Croydon. Miss Mary de Fraine Whitaker, 3, Campden Road, Croydon.

October 17*th.*—H. Whitmore Cutts, L.D.S. England, Ardeen, Masons Avenue, Croydon. Chs. Henry Hughes Williams, 7, Montpelier Row, Blackheath.

November 21*st.*—Mrs. A. C. Crowley, 16, Chatsworth Road. Miss Margaret Page, Woodlands, Coombe Road. Wm. Saville Kent, F.L.S., F.G.S., The Elms, Elmwood Road. Louis Stanley Jart, 203, Brighton Road.

December 12*th.*—Mr. & Mrs. Francis Allen, Croutelle, 3, Friends Road. Charles Fox, The Chestnuts, Warlingham.

January 16*th*, 1900.—Miss Emily Rush, Woodford House School, East Croydon. Miss D. Neligan, Croydon High School. Miss Edith Gladys Parsons, 4, Park Hill Rise. W. J. Allbright, 1, Tamworth Road. W. A. Voss, F.C.S., Rosella, Nicholson Road.

Donations to the Library, 1899.

From Individuals.—Eight microscopical slides of sponges (Mr. W. Murton Holmes); Half a Century of Sanitary Progress and its Results (Dr. H. F. Parsons); Nature Notes of the Selborne Society (Mr. W. Whitaker); Manual of Photography (Mr. Baldock); Text-book of Comparative Geology (Mr. Topley); Applied Geology, Part II. (Mr. J. V. Elsden); Prehistoric Man in the neighbourhood of Kent and Surrey (Mr. G. Clinch).

From Societies.—Report of the Bristol meeting, 1898, of the British Association; Journal of the Royal Microscopical Society; Journal of the Scottish Microscopical Society; Journal of the Belgian Microscopical Society; Journal of the Northamptonshire Natural History Society; The Essex Naturalist; Proceedings of the Academy of Natural Sciences, Philadelphia; Proceedings of the South London Entomological Society; Transactions of the Eastborne Natural History Society; History of the Berwickshire Naturalists Club, and the Session Booke of Bouckle from 1684 to 1690; Report of the East Kent Scientific and Natural History Society; Journal of the City of London College Science Society; Proceedings of the Holmesdale Natural History Club; Transactions of the Norfolk and Norwich Naturalists Society; Proceedings of the Reading Literary and Scientific Society; Report of the Brighton and Hove Natural History and Philosophical Society; Transactions of the Zoological Society on the remains of a gigantic species of bird from the Lower Eocene beds near Croydon; Report of the Geological Institution of the University of Upsala; Tenth Annual Report of the Missouri Botanical Garden; Reports of the Meteorolcgical Council; Report of the Meteorological Observations of the Borough of Southport; Journal of the Manchester Geographical Society; Report of the Kent and Surrey Committee Commons and Footpaths Preservation Society: Journal of the Quekett Microscopical Club.

From Publishers.—Magic Lantern Journal; Photography; The British Journal of Photography; The Amateur Photographer; Science Siftings.

Exhibits, 1899.

February 21*st.*—Mr. A. Hogg: Flint implements from Croham Hurst. Mr. Lovett: Native models of Eskimo sledges. Dr. Parsons: a Roman snail (*Helix Pomatia*) hybernating, with calcareous lid.

March 21*st.*—Mr. Holmes: specimens of glass rope sponges.

April 18*th.*—Dr. Parsons: Gault fossils from the Railway cutting at Merstham, obtained on the excursion of April 8th. Mr. Murton Holmes: A case of slides of Foraminifera from the same cutting. Mr. Goodman: Cases of bees.

May 16*th.*—Geological Section: Sheet of the Index Geological Map, obtained for the use of the Section. Dr. Hinde: A Roman snail, and the lid which the snail throws off after the winter, and also a section of fossil ivory under the microscope. Mr. Hogg: A section of the tusk of the mammoth (*Elephas primigenius*) from Siberia, and a section from the leg-bone of the Swanage crocodile (*Goniopholis crassidens*).

September 19*th.*—Mr. Ed. Lovett: Mexican pottery; shoes worn by oxen in South Africa and part of Switzerland; shoes worn by the dogs of the Eskimo, to protect them from hard snow and sharp ice; a specimen of a natural horn drinking horn, from which our term "tumbler" for a glass is derived; and Limestone striated by glacial action; and also specimens of Alpine Granite, Jura Limestone, &c., from an old moraine near Geneva. Dr. Parsons: Fungi from the Shirley Hills found during the fungus hunt on the previous Saturday; also fossils and Scythe-stones from Blackdown, Devon; and hone stone from Llyn Ogwen, North Wales. Mr. Murton Holmes: Drawings of Radiolaria from Chalk Flints found at Coulsdon; Eocene fossils from Barton Cliff, Hants; and fossil urchins (*Offaster Pilula*) from Winchester. Miss Klaassen: Paintings of fungi, moss, and flowers, done by Miss Stubbs. Mr. Bennett: dried specimens of northern holy grass and vanilla grass. Mrs. Parsons: Apples eaten by insects.

October 17*th.*—Mr. Lovett: A primitive time measuring appliance used by the Brandon flint workers, and specimens of primitive currency. Mr. Jas. Epps, Jun.: Potatoes pierced by Couch grass, and sheaths from bamboo stems. Mr. N. F. Robarts: Specimens of hone stones from Dolwyddelen; Selenite from Thornton Heath; Lingulella from Upper Lingula Slags, Portmadoc, and from Llandeilo Beds, Festiniog.

January 16*th*, 1900.—Mr. Robarts: A few specimens lent to the Museum, including silicified wood found in Sydenham Road, showing Teredo's borings, and coins dug up locally. Mr. Holmes: Some slides of fish parasites.

Croydon Microscopical and Natural History Club.—Balance-sheet for the Year ending 31st December, 1899.

1900. Receipts.	£	s.	d.	£	s.	d.
January 1.						
Subscriptions, 1897	1	0	0			
,, 1898	6	0	0			
,, 1899	101	10	0			
				108	10	0
Sale of Soirée Tickets				15	3	9
Donations—W. Bannerman, Esq.	1	1	0			
,, F. C.-Bayard, Esq. ...	5	0	0			
,, B. Latham, Esq. ...	5	0	0			
,, P. Crowley, Esq. ...	5	0	0			
,, W. Wagstaffe, Esq.	0	2	6			
,, Corporation of Croydon	0	10	0			
,, Sutton Waterworks Co.	0	5	0			
,, Wimbledon Urban District Council ...	0	10	0			
				17	8	6
Sale of Papers and Transactions ...				1	15	6
Balance due to Treasurer				17	1	2
				£159	18	11

1899. Payments.	£	s.	d.	£	s.	d.
January 1.						
Balance of '98 Account due to Treasurer				9	8	0
Rent of Club Room to 31st July				10	0	0
Hire of Rooms for Meetings				4	0	0
Printing Transactions				17	11	0
Fire Insurance—Due to County Fire Office	1	13	9			
Less Bonus received from the Company	1	13	9			
				—		
Meteorol. Sub-Com.—Printing Rainfall Returns, Dec. 1898, to Nov. 1899				24	15	6
Photographic Sub-Committee—						
Hire of Dark Room to 31st July ...	10	0	0			
Hire of Rooms for Lantern Exhibition	4	0	0			
Gas for same, Postages, and Sundries	6	13	1			
Subscrip. to Royal Photogr. Society	1	1	0			
				21	14	1
Soirée Expenses				45	6	11
Stationery and Postages				2	8	0
Printing Monthly Circulars & Postages				15	18	0
Geolog. Sub-Com., Postages & Printing				1	16	5
Subscription to South-Eastern Union of Scientific Societies	0	5	0			
Subscription to Commons and Footpaths Preservation Society ...	0	5	0			
				0	10	0
Assistant Secretary				5	0	0
Gratuities				1	11	0
				£159	18	11
Balance, January 1st, 1900 ...				£17	1	2

SPECIAL FUND ACCOUNT.

£186 9s. 0d. CONSOLS.

1899. January 1.	£	s.	d.
Balance from last Account, January 1st	26	15	10
Dividend, January	1	8	0
,, April	1	8	0
,, July	1	8	0
,, October	1	8	0
Rent of Lockers	0	15	0
Sale of old Lantern Lens	1	10	0
Sale of £24 2s. 8d. Consols @ 104⅓, less Expenses	24	16	0
	£59	8	10
Balance, January 1st, 1900	£25	4	9

1899. January 1.	£	s.	d.
Cost of new Lens for Lantern	1	18	0
,, Museum Cases in Town Hall	30	10	0
,, Trays, Labels, &c., for same	1	16	1
Balance, December 31st	25	4	9
	£59	8	10

BALANCE SHEET.

1900. January 1.	£	s.	d.
Balance of Special Account	25	4	9
Subscriptions, 1900, paid in advance	8	10	0
	£33	14	9

1900. January 1.				£	s.	d.
Deficiency on General Account ...				17	1	2
Balance at Bank	15	3	11			
Balance with Treasurer	1	9	8			
				16	13	7
				£33	14	9

F. J. TOWNEND, *Treasurer.*

We, the undersigned, having examined the above Accounts and the Vouchers relating thereto, hereby certify that they are correct, according to the Vouchers, and the Bankers' Pass Book.

J. HENRY DRAGE,
W. A. WEIGHTMAN.

LIST OF MEMBERS.

(*Revised to January*, 1900.)

Date of Election.

1887. Adam, Walter R., 16 Chepstow-road.
1897. Ainger, William Dawson, Simla, Normanton-road.
1900. Allbright, W. J., 1 Tamworth-road.
1897. Aldrich, Miss F. K., 14 Tavistock-road.
1899. Alexander, E., Grasmere, Birdhurst Rise.
1897. Allan, Arthur Percy, M.B., Abbotsford, Croham-road.
1884. Allen, A. H., 10 Morland-road.
1899. Allen, F., 3 Fell-road.
1899. Allen, Mrs. F., 3 Fell-road.
1899. Allen, G. J., J.P., Dunheved, Dunheved-road North.

1879. Backwell, R. J., 16 Penge-rd., South Norwood.
1873. Bailey, E., 10 Lansdowne-road.
1898. Bailey, H., 10 Lansdowne-road.
1890. Baker, W. R., 9 Belmont Villas, Wallington.
1874. Baldock, J. H., F.C.S., Overdale, St. Leonard's-road, Waddon.
1898. Bannerman, W. B., The Lindens, Sydenham-road.
1885. Barber, J. H., 92 Oakfield-road.
1898. Batten, J., The High Field, Bickley, Kent.
1886. Bayard, F. Campbell-, LL.M., F.R. Met.Soc., Cotswold, Wallington, Surrey.
1899. Bayard, S. Campbell-, Cotswold, Wallington, Surrey.
1871. Beeby, W. H., F.R.M.S., Hildasay, Portsmouth-road, Thames Ditton.
1896. Becker, G. E., Dorincourt, Addiscombe Grove.
1897. Bennett, A., 143 High-street.
Origl. Berney, J., F.R.M.S., Chatsworth-road.
1895. Berry, H. B., Pampisford-road.
1898. Billett, J. T., Ormond Lodge, Richmond.
Origl. Blake, W. J., Elmfield, Park-lane.
1884. Brebner, G. R., M.D., 232 London-road.
1880. Brewer, J. G. B., 12 Havelock-road.
1873. Brodie, R., M.A., 19 Wellesley-road.
1884. Buckland, J. W., Edgecumbe, Ashburton-road.

1877. Carpenter, A. B., B.A., M.R.C.S., F.R.M.S., Bedford Park.
1898. Carr-Dyer, Mrs., Hazelea, Kenley.
1892. Carrington, L., Penmare, Tavistock-road.
1888. Cash, Wm., 15 Fairfield-road.
1897. Chatterton, G., M.I.C.E., 6 The Sanctury, Westminster, S.W.
1880. Cheesewright, F. R., Maythorne, Birdhurst Rise.

1877. Chisholm, J., Addiscombe Lodge, Addiscombe-road.
1877. Chumley, J., Worcester Lodge, Canning-road.
1891. Clark, Hy., 12 High-street.
1897. Clark, J. E., B.A., B.Sc., 48 Coombe-road.
1899. Clinch, G., F.G.S., 22 Nicholson-road.
1882. Collyer, H. C., Breakhurst, Croydon-road, Beddington.
1895. Corser, Rev. R. K., East Brook, Park Hill-road.
1873. Corry, J., J.P., Rosenheim, Park Hill-road.
1887. Couchman, A., Llanberis, Spencer-road.
1879. Cowdell, H. S., Cotleigh, West Wickham.
1898. Craven, M. L., 2 Woburn-road, Wellesley-road.
1897. Cristall, Ed., 1 The Waldrons, Duppas Hill.
1899. Crowley, Mrs. A. C., 16 Chatsworth-road.
Origl. Crowley, P., F.L.S., F.Z.S., Waddon House, Waddon.
1874. Curling, Geo., Elgin House, Addiscombe-road.
1896. Cunnington, J. G. S., 41 Ashburton-road.
Origl. Cushing, Thos., F.R.A.S., 2 Southside, Chepstow-road.
1890. Cutler, W. C., Derwent Bank, Addiscombe-road.
1899. Cutts, H. W., Ardeen, Mason's Avenue.

1887. Davies, A. C., The Glen, Duppas Hill.
1875. Dickenson, Wm., M.A., F.G.S., Warham-road.
1897. Dighton, J., Fairlight, Altyre-road.
Origl. Dix, T. H., 8 High-street.
1891. Dodd, W. H., M.A., Burton, Chatsworth-road.
1895. Donn, Ed., Glenerne, Epsom-road.
1895. Douglas, Thos., Gairloch, Alcester-road, Wallington.
1887. Down, H. W., Bank Chambers, North End.
1888. Drage, J. H., Tamworth-road.
1891. Drew, H. W., Eastgate, Addiscombe-road.
1898. Druce, F., 65 Cadogan-square, S.W.
1893. Dukes, T. A., M.B., B.Sc., 16 Wellesley-road.
1887. Duncan, P. T., M.D., 40 Park-lane.
1891. Durham, R., Nuthurst, Park Hill Rise.

1887. East, F. W., Bleak House, Whyteleafe, Surrey.
1879. Eaton, H. S., M.A., F.R.Met.Soc., 4 Belfield Terrace, Rodwell, Weymouth.
1890. Edridge, Sir F. T., J.P., Addiscombe Court.
1897. Epps, Miss A. M., Norfolk House, Beulah Hill, Norwood, S.E.
1881. Epps, Jas., Jun., Norfolk House, Beulah Hill, Norwood, S.E.

1898. Faunthorpe, Rev. J. P., Whitelands Training College, Chelsea.
1883. Fenn, W. G., Heath Lodge, Thornton Heath.
1898. Field, A. W., Homerton, Addiscombe Grove.
1894. Fitzgerald A., 93 Addiscombe-road.
1892. Flint, R., Woodstock House, Park-lane.
1899. Fox, Ch., The Chestnuts, Warlingham-on-the-Hill.

1891. Gibson, W. M., M.A., 17 Lower Grosvenor-place, S.W.
1897. Goddard, E., 12 Canning-road.
1887. Goodman, C. H., Bryn Cottage, Whyteleafe, Surrey.
1885. Gower, H. D., 55 Benson-road.

1897. Groves, Mrs. M. M., 2 Canning-road.
1885. Grundy, R. F., 112 Lower Addiscombe-road.
1882. Guimaraens, P. G., Parkside, Warham-road.

1899. Hall, A., 16 Park Hill Rise.
1898. Harris, C. P., M.B., 63 Lower Addiscombe-road.
1899. Harvey, J. E., 13 Carew-road, Thorton Heath.
1888. Helps, J. W., As.M.I.C.E., F.C.S., 3 Tavistock-road.
1899. Henderson, G., St. Katherine's, Oxted.
1887. Hinde, Dr. G. J., F.G.S., Avondale-road.
1881. Hobson, Dr. J. M., M.D., B.Sc., 1 Morland-road.
1898. Hobson, B., 1 Morland-road.
1896. Hogg, A. J., 5 Cargreen-road, South Norwood.
1886. Holmes, W. M., Glenside, St. Peter's-road.
1893. Hoole, A. P., The Willows, Sutton, Surrey.
1890. Hopewell, J. M., 79 Lansdowne Gardens.
1891. Hovenden, A., Oaklands, Haling Park-road.
1881. Hovenden, R. G., Heathcote, Park Hill-road.
1885. Hughes, M., M.R.C.S., L.D.S., Eastbridge, Addiscombe-road.
1896. Hunt, G. H., Leecroft, St. Peter's-road.

1890. I'Anson, W. H., 39 Dingwall-road.
1871. Ingrams, W., Whitgift Schools, Church-road.

1897. Jackson, M., J.P., 139 Lower Addiscombe-road.
1898. Jackson, T. D., Hillbrow, Heathfield-road.
1894. Jarrett, C., 2 St. John's-grove.
1899. Jast, L. S., 203 Brighton-road.
1896. Johnson, E. W., 50 Birdhurst-road.
1897. Jones, E. H. S., 1 Craigerne-road, Blackheath.

1899. Kent, W. S., F.Z.S., F.L.S., The Elms, Elmwood-road.
1888. Klaassen, H. M., Aberfeldy, Campden-road.
1897. Klaassen, Miss, Aberfeldy, Campden-road.

1877. Laing, R. A., 43 Addiscombe-road.
Origl. Latham, B., C.E., Duppas House.
1892. Lincoln, J. G., Kirkdale, Selsdon-road.
1896. Link, F., 43 Park Hill-road.
1891. Lloyd, F., Coombe House, Coombe-road.
1892. Lloyd, A., Coombe Wood, Coombe-road.
1895. Lock, W. J., Llanberis, Avondale-road.
1898. Lock, W. B., Llanberis, Avondale-road.
Origl. Long, Hy., 132 High-street.
1874. Lovett, E., 41 Outram-road.

1898. Maitland, F. W., Jesmond Lodge, St. Peter's-road.
1895. Malden, A., 26 Windmill-road.
1898. Male, H. C., M.D., 74 Birdhurst-road.
1886. Marshall, R., 31 The Waldrons.
1899. Martin, E. A., 23 Campbell-road.
1895. Martyn, J. W., 74 Wellesley-road.
1878. Mather, C. W., 47 Dingwall-road.
Origl. McKean, K., F.L.S., Lloyds, London, E.C.

1886. McLachlan, R., F.R.S., F.L.S., 23 Clarendon-road, Lewisham.
1879. Mennell, H. T., The Red House, Park Hill Rise.
1895. Moore, G. W., Bryndhurst, Dornton-road.
1896. Moore, H. K., Chipstead, Chepstow Rise.
1898. Morris, W., C.E., The Kent Waterworks, Deptford, S.E.
1880. Morton, S., M.D., Wellesley Villas, Wellesley-road.
1880. Morris, A. M., Harcourt-road, Wallington.
1895. Moss, A, 3 High-street, South Norwood.
1897. Moss, M. L., Montorio, Park Hill Rise.

1900. Neligan, Miss D., Croydon High School, Wellesley-road.
1895. Newby, G. E., F.R.C.S., 124 Lower Addiscombe-road.

1874. Oldfield, J., 16 Tamworth-road.
1895. Olive, C. D., M.A., Rokeby, The Downs, Wimbledon.

1892 Packham, J., 16 Katharine-street.
1899. Page, Miss M., Woodlands, Coombe-road.
1892. Page, Thos. K. F., 9 Rosemount, Wallington.
1881. Parsons, H. F., M.D., F.G.S., Oakhyrst, Park Hill Rise.
1897. Parsons, Mrs., Oakhyrst, Park Hill Rise.
1900. Parsons, Miss E. G., Oakhyrst, Park Hill Rise.
1895. Parsons, S. G., Downside, Epsom.
1893. Pascall, J., Ambleside, Addiscombe-road.
1891. Pelton, J. O., 26 Friends'-road.
1894. Perrey, H. W., The Cedars, London-road.
1897. Petri, R., Hazeltryst, Havelock-road.
1892. Phillips, H. W., M.D., 28 Addiscombe-road.
1870. Philpot, C.W., M.D., Friends' House, Park-lane.
1898. Pierce, E., Claremont, Balfour-road, South Norwood.
1896. Platts, E. J., Haslemere, St. Leonard's-road.
Origl. Price, G. N., 74 High-street.
1897. Purser, J., 41 Addiscombe-road.
1880. Pye-Smith, A., J.P., 27 Park Hill Rise.

1885. Reed, L., Hyrst Hof, South Park Hill-road.
1880. Rich, A. W., Grove House, Chatsworth-road.
1895. Ritchie, Rt. Honble. C. T., M.P., 19A Wetherby Gardens, South Kensington.
1894. Robarts, N. F., F.G.S., 23 Oliver-grove, South Norwood.
1888. Roods, A., 67 Thornhill-road.
1900. Rush, Miss E., Woodford House School, East Croydon.
1895. Russell, C. J. L., Upton Dene, 56 Coombe-road.
1877. Rymer, S. L., J.P., Wellesley-road.

1892. Salmon, C. E., Clevelands, Wray Park, Reigate.
1888. Sandell, J. T., 213 Selhurst-road, South Norwood.
1888. Schmitz, J. H., J.P., 4 Lansdowne-road.
1895. Shore, E. L., Lansdowne Villa, Wellesley-road.
1896. Shore, E. R., Lansdowne Villa, Wellesley-road.
1896. Shore, H. H., Lansdowne Villa, Wellesley-road.
1895. Slack, J. W., 64 Park-lane.
1896. Smart, H. C., 29 Cherry Orchard-road.

1899. Smedley, E. A., M.A., B.Sc., 173 Albert-road.
1899. Smee, A. H., The Grange, Wallington, Surrey.
1894. Smith, H. D., 19 Cedars-road, Beckenham.
1894. Smith, Dr. S. Parsons, Park Hyrst, Addiscombe-road.
1898. Stanley, J. H., 51 Morland-road.
Origl. Stanley, W. F., F.G.S., Cumberlow, Lancaster-road, South Norwood.
1896. Stokes, F., 125 Melfort-road, Thornton Heath.
1878. Straker, E., Richmond, Malden-road, Wallington.
1888. Streeter, J. S., 78 High-street.
1874. Swaine, J. C., 52 Park Hill-road.
1882. Syms, J. E., Stanton Villa, Stanton-road.

1897. Tarver, A., Polruan, Stuart-road, Thornton Heath.
1898. Tate, A., Downside, Leatherhead.
1898. Taylor, Rev. C. H., The Larches, Banstead.
1880. Thompson, F., Lynton, Haling Park-road.
1894. Thompson, H. C., Hermitage, Dunheved-road South, Thornton Heath.
1878. Thompson, H. G., M.D., J.P., 86 Lower Addiscombe-road.
1892. Thorpe, C., Selborne, Chatsworth-road.
1899. Topley, E. E., Ingleside, St. Augustine's Avenue, S. Croydon.
1898. Topley, W. W., 3 Marlborough-road, South Croydon.
1896. Townend, F. J., 11 Park Hill Rise.
1898. Tyndall, W. H., Morlands, Oxford-road, Redhill.

1900. Voss, W. A., F.C.S., Rosella, Nicholson-road.

1877. Walker, T., C.E., Warrington-rd., Duppas Hill.
1876. Walton, A., The Homestead, Bedford Park.
1897. Ward, Miss C., 36 St. Peter's-road.
1877. Warner, A., 2 Grosvenor Villas, Holmesdale-road, Selhurst.
1881. Waterall, N., Waddon Lodge, Croydon.
1897. Waterall, Miss F. A., Grove Cottage, Addiscombe-grove.
1895. Weightman, A. J., Langdale, Chepstow Rise.
1897. Weightman, W. A., Langdale, Chepstow Rise.
1898. Webster, R. T., 13 Havelock-road.
1877. Wenham, W. P., Horndean, Waddon.
Origl. West, F., The Waldrons.
1875. Whealler, G. A., 46 Friends'-road.
1896. Whitaker, W., F.G.S., F.R.S., Freda, Campden-road.
1899. Whitaker, Miss M. de F., Freda, Campden-road.
1887. Wild, A. S., 28 Canning-road.
1883. Williams, B. A., L.D.S., 22 Wellesley-road.
1899. Williams, C. H. H., 7 Montpelier-road, Blackheath.
1892. Willoughby, C. W., 28 Friends'-road.
1896. Wills, G. S. V., Southwood, Croham-road.
1897. Wills, Miss G., Southwood, Croham-road.
1889. Wise, H. R., Beechfield, Bramley-hill.
1895. Wissenden, A. C., 50 Canning-road.
1887. Wratten, F. C. L., Hellingley, Dingwall-avenue.

BRITISH MUSEUM

TRANSACTIONS

OF

THE CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

1898–99.

144.—The Commons near Croydon, and their Flora.

By H. Franklin Parsons, M.D., F.G.S.

(Read February 21st, 1899.)

The South-east of England owes much of its beauty and amenity to its numerous commons, heaths, and open grassy downs, over which one may roam in enjoyment of a delightful sense of freedom, and where we may see Nature in something like her primitive aspect. In this respect the south-eastern counties are in contrast with other parts of the country, such as the fertile but unpicturesque plains of the Midlands, where the land is all enclosed or parcelled out into formal and highly cultivated fields, separated by closely trimmed hedges, and diversified only with an occasional spinney or plantation for the benefit of the fox-hunter. We at Croydon, though there is now no common within the borough, are fortunate in possessing two beautiful open spaces on our immediate border—*viz.* Shirley Hills and Croham Hurst; within an easy distance are Mitcham and Hayes Commons, and Riddlesdown; while farther off are Keston Common, Worms Heath, Farthing Down, Park Downs, and others. In speaking of these as commons, I only use the word for convenience as meaning an open tract of land which has never been brought under cultivation, and not in a legal sense as implying the existence of rights of common. Indeed, as I understand, to the lawyer the word "common" means not a tract of open land, but a right to a share in the natural produce of land the soil of which belongs to another person. Such a tract of land as in ordinary speech is called a

common is usually in legal language "waste of the manor": the soil belongs to the lord of the manor, but the freeholders and copyholders of the manor have certain rights over it—*e. g.* the right to turn out to pasture upon it as many horses, cattle, and sheep as their respective holdings can support during the winter; and in some cases the right to cut fuel or dig gravel for their own use.

In early periods of English history the land was mainly uninclosed; but with the growth of the population the wastes gradually became inclosed, sometimes under the authority of law, at other times by unauthorized encroachments on a large or small scale. As Hudibras says—

> "The law condemns the man or woman
> Who steals a goose from off a common,
> But lets the greater villain loose
> Who steals the common from the goose."

In the last century and the earlier part of the present one the dictum of Dean Swift, that the greatest benefactor to mankind was the man who made two blades of grass grow where only one grew before, was in high esteem; and under the influence of the high prices of food, brought about by wars and duties on imported corn, numerous Inclosure Acts were passed under which much of the more fertile common land was divided up and brought under cultivation. Even so late as 1846 a general Inclosure Act was passed to facilitate the process of inclosure and obviate the need for obtaining private Acts. But in the middle of the present century the repeal of the Corn Laws made the country no longer dependent wholly on home-grown corn for its supply of food; the growth of towns drew attention to the importance of preserving open spaces in their vicinity; and people began to appreciate that man does not live by bread alone, but that there are other things—such as health, recreation, and enjoyment of the beauties of Nature—to be taken into consideration. Until recent years the law had recognized no right on the part of the public at large to the use of a common for purposes of recreation, but only the right of the commoners to pasturage or similar uses; hence it was in the power of the lord of a manor to buy up the commoners' rights and inclose the common, even against the wishes of some of the commoners. But some thirty years ago a movement, headed by the late Prof. Fawcett and by Mr. Shaw Lefevre, was started for the preservation of commons; in 1866 the Metropolitan Commons Act was passed for the preservation and regulation of the commons around London within the Metropolitan Police District, and, ten years later, the Commons Act of 1876. In the latter Act it is directed that inclosures, as opposed to regulation of commons, should not

be made unless it be proved to the satisfaction of the Commissioners (now the Board of Agriculture) and of Parliament that such inclosures will be of benefit to the neighbourhood as well as to private interests; and in every order made for the inclosure of a common certain conditions, so far as applicable, shall be inserted for the benefit of the neighbourhood—such as the preservation of free access to any particular point of view; of particular trees and objects of historical interest; of space for recreation; and of roads and footpaths. It is stated that under the private Inclosure Acts passed during the last century and the first half of the present one, some seven millions of acres of common land were inclosed, and under the Inclosure Act of 1846, 618,000 acres more; but in the twenty years 1876–1895 only about 26,600 acres have been inclosed.

In Croydon the commons were inclosed in the last century, though the names of Croydon Common and Thornton Heath still survive in what are now populous districts. In the Inclosure Act a piece of woodland in the North Wood—*i. e.* Norwood—was reserved to the parish to furnish the poorer inhabitants with fuel; the parishioners, however, afterwards shortsightedly sold it for £2000, wherewith to build a town hall "for the better entertainment of His Majesty's Judges." This town hall, which was never an object of beauty, and had become inadequate for the needs of the town, was pulled down a few years ago; so that Croydon has nothing left to show for the loss of its commons. If the money for building the town hall had been borrowed, it would long since have been paid off, and the land at Norwood would now have been of great value. We have of course recreation grounds, but they have been laid out in recent years, and can hardly be said to illustrate the native flora.

Of the commons and open spaces near Croydon, Shirley Hills are maintained by the Corporation of Croydon; and Mitcham Common, Hayes Common, and Wimbledon Common by Conservators; while West Wickham Common, Riddlesdown, Farthing Down, Kenley Common, and Coulsdon Common are maintained by the Corporation of the City of London, to whom the public are also indebted for the preservation of Epping Forest and Burnham Beeches. It is to be hoped that some such benefactor may come forward to save for us our beautiful Croham Hurst.

But when a common itself has been secured to the public as an open space, the native flora which has escaped the ploughman or the speculative builder finds another enemy in the landscape gardener, whose idea of improvement is to drain the wet places, or else form them into artificial pools; lay out roads and avenues; level and smooth the turf; plant borders and shrubberies; and thus convert into a trim park or formal garden what was a relic of primitive wilderness. The commons which are favourite holiday

resorts are frequented by increased numbers of people; and the more showy plants suffer at the hands of trippers, and the rarer ones through the rapacity of collectors. In dry seasons the herbage is often destroyed by fires. When a common gets surrounded by houses, the smokiness of the air is unfavourable to the growth of certain plants, especially of cryptogams. From all these causes it happens that the original flora of our commons, especially near towns, tends to become impoverished by the loss of its most interesting members, while, on the other hand, introduced species of plants may be added. This leads me to the suggestion which is the main object of this paper—*viz.* that our Club should compile for future reference lists as complete as possible of the flora of each of our commons and wild spaces in the neighbourhood of Croydon. The compilation of such lists would afford opportunity for interesting comparisons between the floras of different open areas. Thus it would be seen what an almost complete difference there is between the plants growing on a gravelly heath, such as Shirley Hills or Keston Common, and those on a chalk down, such as Riddlesdown and Farthing Downs. The flora of a tract containing wet places, like Keston Common, would also contain many species not met with on a dry tract like Hayes Common. But, apart from these differences of soil, there is hardly one of the commons around Croydon which does not contain in its flora some plant which is not met with on the others. Thus Croham Hurst has the whortleberry and lily of the valley; Hayes Common the butcher's broom; Keston Common the sundew, bog asphodel, and meadow thistle (*Carduus pratensis*); and Chislehurst Common the bog St. John's wort (*Hypericum elodes*) and pennyroyal. A catalogue of the insects and mollusca of each of these commons would doubtless show like differences.

The commons on the pebble beds of the Oldhaven series have a peaty soil on which the heaths are the predominant feature in the vegetation. We find on Shirley Hills, for instance, three species of heath—*viz.* the ling, the cross-leaved heath, and the purple heath. Of these the latter is confined to dry places, and the cross-leaved heath to wet places, while the ling is ubiquitous there. The larger terrestrial mosses and lichens and fungi are plentiful, and in the wet hollows boggy places are formed where plants such as *Sphagnum*, sundew, and petty whin occur. Where the pebble gravel is less sharp and the top soil is loamy, the gorse is the predominant shrub, as on Hayes Common and Chislehurst Common, and also on the alluvial gravel of Mitcham Common. Where the soil is fine sand, as on parts of Shirley Hills, Hayes Common, and Mitcham Common, minute annual plants, such as species of *Trifolium* and *Cerastium*, *Mœnchia erecta*, *Ornithopus perpusillus*, and *Erodium cicutarium* are found.

The chalk downs support a fine close velvety herbage composed of a much larger number of species of plants than are to be met with on sandy, clayey, or peaty soils. The juniper is the characteristic shrub, and among other plants peculiar to a chalky soil may be mentioned the rock rose, the small burnet (*Poterium Sanguisorba*), the horse-shoe vetch (*Hippocrepis comosa*), the dropwort (*Spiræa Filipendula*), and the small scabious (*Scabiosa Columbaria*). The plants of wet situations are, as might be expected, absent on our dry chalk commons.

The following are further particulars about the principal commons in our neighbourhood:—

Shirley Hills.—Area of space dedicated to the public, 87 acres; altitude 340–480 ft. (o. d.);—consist geologically of a bank of rounded flint-pebbles, formed on or near the old tertiary sea-shore, and more than 50 ft. thick. The most prominent features of these hills are the steep rounded slopes and deep intersecting hollows on their north side—*i. e.* in the direction of the dip of the strata. In this respect they differ from the other commons and tracts of Oldhaven pebble beds in this neighbourhood, which, though they may have an abrupt escarpment on the south side, at the outcrop of the pebble bed, as at Hayes and Keston Common, have only a gradual slope northwards in the direction of the dip. The peculiar formation of the Shirley Hills is probably due to the way in which the pebbles have been originally heaped up at this spot. The pebble bed varies greatly in thickness; thus in the Park Hill Rise section, described by me in a paper read to the Club in 1896, it was found to vary from 4 in. to 11 ft. in thickness in less than a quarter of a mile. Botanically, the chief rarities at Shirley Hills are found in the enclosed portion near Oaks Road, and therefore hardly come within the limits of my paper; but many interesting plants may be found, especially in the damp hollows. Some, however, have disappeared: thus, some years ago I saw young plants of the northern hard fern (*Lomaria spicant*), but have not found it in recent years. Some of the larger terrestrial mosses and lichens are plentiful, and in the sides of ditches in the damp hollows are to be found several species of scale mosses (*Jungermanniaceæ*). These may be found in fruit in spring; and their black shining capsules, borne on silvery thread-like stalks, and ultimately splitting into four valves, and discharging spores mingled with spiral threads, form interesting and beautiful microscopic objects.

Fungi are plentiful in autumn; among them may be mentioned the beautiful but poisonous fly agaric, with its tall ringed stem and scarlet cap dotted with white warts; *Sparassis crispa*, a rare and curious sponge-like species; and *Torrubia militaris*, a species parasitic upon caterpillars. The mycelium of this fungus penetrates

the tissues of the caterpillar, and when the latter has buried itself in the ground it dies, and the fungus sends up its fructification in the form of a slender orange club, the stalk of which can be traced down into the body of the dead insect.

Croham Hurst.—Area 80 acres; altitude 288–477 ft. This hill is an outlier of the Oldhaven pebble beds, surrounded on all sides by chalk, the intervening Woolwich Beds and Thanet Sand being very thin, and almost wanting; hence, in the absence of an impermeable bed to throw out the water from the gravel, there are no springs or wet places. The south slope of the hill is in places so steep that no vegetation can find a foothold, and the pebble gravel is left bare. The summit of the hill is open heathy ground, but the sides and base are wooded. The flora in the woods at the base of the hill on the chalk is markedly different from that on the pebble beds higher up. Among the species found at Croham Hurst are the whortleberry and the lily of the valley; though the latter appears very seldom to flower there. The rare ground-pine (*Ajuga chamæpitys*) grows close to, if not actually within, the Hurst.

Hayes Common and West Wickham Common together form one open tract, being only separated from one another by an unfenced road. This tract has an area of 200 acres, and varies in altitude from some 230 to 400 ft. It rests on the pebble beds, which end in a steep escarpment on the south and west. On the top of West Wickham Common at its south-west corner are some ancient barrows and entrenchments, possibly marking the site of a battle which is said to have taken place at Addington between Hengist and the British. A noticeable feature is the fine group of venerable oaks on the steep north-west slope of West Wickham Common, the ground beneath which in spring is carpeted with bluebells. Among plants met with at Hayes and West Wickham Commons are *Saxifraga granulata*, the climbing fumitory (*Corydalis claviculata*), *Mœnchia erecta*, and *Trifolium glomeratum*. The butcher's broom (*Ruscus aculeatus*) grows close to but not actually on the common.

Keston Common.—Area 55 acres; altitude 400–520 ft.; is situated on the north slope of the Oldhaven pebble beds, and is intersected by two valleys, one of which is occupied by a boggy piece of ground, and the other by artificial ponds. Keston Common has perhaps the most interesting flora of any of the commons near Croydon. In the boggy ground are found the sundew (*Drosera rotundifolia*), the marsh pennywort, the bog violet, the bog asphodel, *Carduus pratensis*, and several species of *Sphagnum*; while in the ponds grow the arrow-head, the small bur-reed, *Scirpus fluitans*, and several other aquatic plants—whether planted or brought by birds, I cannot say. In 1894 I saw a single plant of the butterwort (*Pinguicula vulgaris*) at

Keston Common, but though, of course, I did not disturb it, I have not seen it there since. Mr. Beeby suggests that it may have been planted, as *Pinguicula* is not known to grow elsewhere in this part of the country. I also found there a specimen of the white mullein (*Verbascum Lychnitis*), usually a plant of the chalk.

Mitcham Common.—Area 480 acres; altitude 80–112 ft.; is flat and low lying, resting on the alluvial gravels of the Wandle valley. It is perhaps the least picturesque of the commons in this neighbourhood, being covered with stunted gorse bushes, while part of it has been excavated for gravel. Several interesting dwarf plants, however, grow there, as *Trigonella ornithopodioides* and *Limosella aquatica*.

Wimbledon Common with Putney Heath.—Area 1000 acres; altitude 30–180 ft.; is on a plateau of gravel, resting on London Clay. The higher part is peaty, and the smaller sundew (*Drosera intermedia*) formerly grew there.

Worms Heath.—Area 37 acres; altitude 700–800 ft.; is on an outlier of Oldhaven pebble gravel, which contains masses of hard ferruginous conglomerate.

Farley Green (area 20 acres; altitude 540–570 ft.) and Kenley Common (area 77 acres; altitude about 550 ft.) are situated on the clay-with-flints, over the chalk; and their flora, as is usually the case on clayey tracts, presents, so far as I have seen, no very noticeable feature.

Riddlesdown.—Area 120 acres; altitude 240–420 ft.

Farthing Down.—Area 100 acres; altitude 400–500 ft.

Park Down.—Area 77 acres; altitude 400–500 ft.

Banstead Downs.—Area 400 acres; altitude 300–450 ft.

Epsom Downs.—Area 430 acres; altitude 350–500 ft.

These are all on the chalk, and their flora has the general character before described. The white mullein (*Verbascum Lychnitis*) grows at Riddlesdown, and the sweet briar (*Rosa rubiginosa*) at Epsom Downs. At the last mentioned place a little ling grows, a rare occurrence, as the heaths usually shun a calcareous soil; but probably at this spot the chalk is more or less covered by some superficial bed.

A more careful investigation of the flora of these commons than I have yet made might be expected to yield interesting results, and this is the work which I propose for the Club. Each common should be visited several times a year, London Catalogue in hand, and all the species observed within the limits open to the public should be marked, common as well as rare ones. The cryptogams should if possible be recorded as well as the flowering plants. The help of all members of the Club is invited, and the Botanical Sub-Committee would be happy to render assistance in naming doubtful finds.

145.—Report of the Meteorological Committee for 1899.

Prepared by the Hon. Sec., Francis Campbell-Bayard, F.R.Met.Soc.

(Read 20th February, 1900.)

The arrangements under which the daily rainfall of the district around Croydon has been observed and tabulated have been carried out with, it is hoped, the same efficiency as in previous years. The number of stations in the printed sheet is 85, an increase of five over the year 1898, and there is one station (the Sewage Farm, Carshalton) not in the printed list, the observations of which are quite complete, and will be found at the end of this Report.

It is with very great regret that the Sub-Committee have to announce the discontinuance of five stations at the end of the year. Three of these stations have come to an end owing to the death of the observers—*viz.* Reigate which has been in existence for five years, Coulsdon with a record of ten years, and Sydenham with a record of three years. The other two stations, *viz.* Thornton Heath with a record of eight years, and Richmond with a record of twenty-eight years, have come to an end owing to the discontinuance of the observations, in the first case due to old age, and in the second to the removal of the observer. The loss of two of these stations, *viz.* Coulsdon and Richmond, is much to be deplored, owing to the great difficulty of finding new observers in these neighbourhoods, Two other observers have also died during the year, *viz.* Lord Farrer and Sir J. F. Lennard, Bart., but, so far as is at present known, the records will be continued. The Sub-Committee consider that it would be a very graceful act on the part of the Club if a vote of condolence and thanks was passed to the families of the deceased observers, and to the two gentlemen who have discontinued their observations, for the great services rendered to the Club in the past.

Appendix I. to this Report contains a list of the observers, with particulars relating to the stations and gauges, and also the monthly tables of daily rainfall, of which a sufficient number have from time to time been pulled for the use of the Club. These printed tables contain the records of all observers, with the exception of the observer at Carshalton, reporting to the Sub-Committee, and it will be observed that the records are 83 in number, and that all, with the exception of two, are complete to the end of the year. The number of observers whose records are printed is 65, as against 64 in 1898.

Appendix II. contains a record of all falls of rain of 1·00 in. and upwards, extracted from the monthly tables in Appendix I. It will be noticed that there is only one fall over 2·00 in., and

that the number of days on which these falls occurred is seven. Attention will be called to this Appendix further on in this Report.

So far as the records of rainfall in the possession of the Sub-Committee show, the year has been a dry year, the deficiency throughout the district being something like 2 in. The deficit does not on paper look very serious, but in order to show what a serious state of things is revealed, tables A, B, C, and D, have been constructed. These four tables have been constructed on the same plan. Tables A and B refer to Greenwich, table C to Surbiton, and table D to Wimbledon (Mt. Ararat).

A single glance at these tables will show the state of affairs. Table A shows the departures from the Greenwich average of 80 years of each of the past 10 years, and the result shows a deficit of just 28 in., which is practically just 3 in. above a

A.—*Greenwich Av.* 80 *Yrs.* (1816–95) 24·96 in.

Year		± Average
	IN.	IN.
1890	21·88	− 3·08
1891	25·02	+ 0·06
1892	22·35	− 2·61
1893	20·09	− 4·87
1894	26·88	+ 1·92
1895	19·72	− 5·24
1896	22·47	− 2·49
1897	22·08	− 2·88
1898	18·85	− 6·11
1899	22·33	− 2·63
Total deficiency		− 27·93

B.—*Greenwich Av.* 40 *Yrs.* (1856–95) 24·22 in.

Year		± Average
	IN.	IN.
1890	21·88	− 2·34
1891	25·02	+ 0·80
1892	22·35	− 1·87
1893	20·09	− 4·13
1894	26·88	+ 2·66
1895	19·72	− 4·50
1896	22·47	− 1·75
1897	22·08	− 2·14
1898	18·85	− 5·37
1899	22·33	− 1·89
Total deficiency		− 20·53

C.—*Surbiton Av.* 40 *Yrs.* (1856–95) 24·42 in.

Year		± Average
	IN.	IN.
1890	19·41	− 5·01
1891	27·79	+ 3·37
1892	21·17	− 3·25
1893	18·77	− 5·65
1894	27·67	+ 3·25
1895	20·79	− 3·63
1896	24·60	+ 0·18
1897	24·43	+ 0·01
1898	18·55	− 5·87
1899	21·38	− 3·04
Total deficiency		− 19·64

D.—*Mt. Ararat, Wim., Av.* 40 *Yrs.* (1856–95) 24·06 in.

Year		± Average
	IN.	IN.
1890	21·42	− 2·64
1891	28·39	+ 4·33
1892	25·36	+ 1·30
1893	19·32	− 4·74
1894	29·54	+ 5·48
1895	22·05	− 2·01
1896	23·82	− 0·24
1897	24·10	+ 0·04
1898	18·97	− 5·09
1899	22·32	− 1·74
Total deficiency		− 5·31

year's average rainfall. Table B shows the departures from the Greenwich average of 40 years of each of the same past 10 years, and the result is a deficit of 20½ in., which is practically 3¾ in. below the year's average rainfall. In both of these tables it will be noticed that only the years 1891 and 1894 have a rainfall over the average. Table C refers to Surbiton, on the western side of the Club's district. This table shows the departures from the same 40 years' average of each of the same 10 years, with the result of a deficiency of rather over 19½ in., which is practically nearly 5 in. below the year's average rainfall. In this table it will be noticed that 4 years have a rainfall over the average, one of which years, however, *viz.* 1897, may be disregarded. Table D refers to Wimbledon, and here we have a very different state of things. This table shows the departures from the same

A.—*Greenwich Average* 80 *Yrs.* (1816–95).

	Average	1899	± Average
	IN.	IN.	IN.
Jan.	1·89	2·52	+ 0·63
Feb.	1·59	1·93	+ 0·34
March	1·52	0·61	− 0·91
April	1·65	3·00	+ 1·35
May	2·00	1·65	− 0·35
June	1·95	1·20	− 0·75
July	2·60	1·29	− 1·31
Aug.	2·33	0·35	− 1·98
Sept.	2·30	2·26	− 0·04
Oct.	2·82	2·32	− 0·50
Nov.	2·37	3·73	+ 1·36
Dec.	1·94	1·47	− 0·47
Year	24·96	22·33	− 2·63

B.—*Greenwich Average* 40 *Yrs.* (1856–95).

	Average	1899	± Average
	IN.	IN.	IN.
Jan.	1·98	2·52	+ 0·54
Feb.	1·43	1·93	+ 0·50
March	1·44	0·61	− 0·83
April	1·61	3·00	+ 1·39
May	1·94	1·65	− 0·29
June	2·04	1·20	− 0·84
July	2·42	1·29	− 1·13
Aug.	2·30	0·35	− 1·95
Sept.	2·18	2·26	+ 0·08
Oct.	2·75	2·32	− 0·43
Nov.	2·19	3·73	+ 1·54
Dec.	1·94	1·47	− 0·47
Year	24·22	22·33	− 1·89

C.—*Surbiton Average* 40 *Yrs.* (1856–95).

	Average	1899	± Average
	IN.	IN.	IN.
Jan.	2·04	2·43	+ 0·39
Feb.	1·47	2·40	+ 0·93
March	1·44	0·44	− 1·00
April	1·64	2·44	+ 0·80
May	1·92	1·46	− 0·46
June	2·08	1·15	− 0·93
July	2·37	0·34	− 2·03
Aug.	2·43	0·46	− 1·97
Sept.	2·21	2·57	+ 0·36
Oct.	2·81	2·21	− 0·60
Nov.	2·16	4·21	+ 2·05
Dec.	1·85	1·27	− 0·58
Year	24·42	21·38	− 3·04

D.—*Mt. Ararat, Wim., Av.* 40 *Yrs.* (1856–95).

	Average	1899	± Average
	IN.	IN.	IN.
Jan.	1·79	2·22	+ 0·43
Feb.	1·38	2·15	+ 0·77
March	1·33	0·61	− 0·72
April	1·64	2·37	+ 0·73
May	1·92	1·54	− 0·38
June	2·08	1·01	− 1·07
July	2·49	0·67	− 1·82
Aug.	2·31	0·39	− 1·92
Sept.	2·28	3·43	+ 1·15
Oct.	2·88	2·31	− 0·57
Nov.	2·19	4·36	+ 2·17
Dec.	1·77	1·26	− 0·51
Year	24·06	22·32	− 1·74

40 years' average of each of the same 10 years, with the result of a deficiency of only 5¼ in. This result is startling; but if the table be examined it will be seen to be the result of 3 years of excessive rainfall (for the excess in 1897 may be disregarded) combined with smaller deficits in other years. I do not suppose that anyone would have imagined that over the series of years shown in the table the deficit at Surbiton would be nearly four times as great as at Wimbledon.

Let us now come back to the year 1899, and see how the deficit shown in the first set of tables has arisen.

With this view I have again constructed, on the model of previous years, tables A, B, C, and D. Tables A and B refer to Greenwich. It will be noticed that in table A there are only four months showing an excess of rainfall, whilst in table B there are five, the fifth month being September, the other four in each case being January, February, April, and November. Table C refers to Surbiton, and table D to Wimbledon. In the two latter tables the same five months as in table B are in excess. If one examines these tables some very curious features present themselves. I will take, first, the month of April. In table A, with the 80 years' mean, there is an excess of 1·35 in.; and in table B, with the 40 years' mean, of 1·39 in., an excess which, though the same 40 years are taken, diminishes, in the case of Surbiton to 0·80 in., and Wimbledon to 0·73 in. Let us now take the month of November. This month was an exceedingly curious one, being extremely wet at the beginning and extremely dry at the close. I have no doubt that you all, like myself, were wondering what the rainfall of that month was going to amount to, when it suddenly stopped completely. If we turn to the tables, we see that there is in table A an excess of 1·36 in., in table B of 1·54 in., in table C of 2·05 in., and in table D of 2·17 in., very nearly the exact opposite of what occurred in April. If we now turn to the deficiencies, we shall first notice the month of June. Here the deficiency increases throughout the four tables: in table A it is 0·75 in., in table B it is 0·84 in., in table C it is 0·93 in., and in table D it is 1·07 in. Again, let us take the month of August. Here we have a distinct change, in that the deficiency in the four tables is practically the same, only differing from one another by a very few hundredths; in table A it is 1·98 in., in table B it is 1·95 in., in table C it is 1·97 in., and in table D it is 1·92 in. Again, if we take the month of July we have another change. In table A the deficiency is 1·31 in., in table B it is 1·13 in. In table C it is nearly an inch more than in table B, *viz.* 2·03 in., whilst in table D it is less than that of table C, *viz.* 1·82 in. It is extremely difficult to account for these different excesses and deficiencies without intervening gauges, which do not exist, and which even if they

had existed would, it seems to me, have thrown very little light on these peculiarities, owing to the want of trustworthy averages of a sufficiently long time with which to compare them.

I should like to say a few words with reference to November fall, in order to amplify the remarks in the printed notes of this month. It is extremely rare to have two falls consecutively of over 1 in., and only one instance occurs at Brixton, in, I think, July, 1867, and none at all at Greenwich. On looking over the November tables, we shall see this very rare circumstance in Westerham (Town), *viz.* on 2nd we have 1·02 in., on the 3rd 1·23 in., and on the 5th 1·68 in., a record which I think must be nearly, if not quite, unique in the South-East of England.

With respect to the peculiar dust-storm mentioned in the August notes as having occurred on the 15th, the observer at Kenley, who was then staying at Hindhead, near Haslemere, Surrey, says, in a letter dated September 2nd, "the same sudden gust of wind, whirling the trees about, and only lasting two or three minutes, occurred at 5 p.m. and again at 7·30 p.m. A peculiar lull and airless feeling as before a storm preceded it, and all windows and doors were hastily closed. The heat was intense; no rain fell. The centre of the storm seemed to be over Oxford." So far as is known, no account of this storm has been published, and it seems desirable that it should be put on record.

In Appendix II. the falls of rain of 1·00 in. and upwards are set out. The number of days on which these fell is 7 as against 5 in 1898. There is only one fall over 2·00 in., *viz.* 2·18 in. at Abinger Rectory on Nov. 3rd. The falls on September 29th, November 3rd, and November 5th seem to have been fairly general throughout the district.

In conclusion, the Sub-Committee desire to tender their thanks to all those, numbering eight, who have so kindly sent donations to enable the Club to continue this useful organization. The Sub-Committee also tender their thanks to the observers for their returns, and also for the notes which many of them contribute, and which tend to make the returns much more valuable and interesting.

The Sewage Works, Carshalton, Surrey.

Observer—W. Willis Gale. Gauge 5 in. in diameter.

Height of gauge above ground, 1 ft.

Height of station above sea-level, 118 ft.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
2·71	2·30	0·61	2·30	1·26	0·67	0·39	0·60	2·51	2·34	4·40	1·72	21·81

APPENDIX I.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB

(Meteorological Sub-Committee.)

No.	Stations.	Observers.	Size of Gauge.	Height above Ground.		Height of Statn. ab. Sea-level.
			IN.	FT.	IN.	FT.
	Abinger (The Hall)	The Lord Farrer	8	2	0	320
	Abinger (The Rectory)	Miss Brodie-Hall	5	1	0	381
	Dorking (Denbies)	J. Beesley	5	0	6	610
	Redhill (Oxford Road)	W. H. Tyndall	8	1	0	300
5	Nutfield (The Priory)	J. Moffatt	8	1	2	468
	Nutfield (The Priory) 2nd gauge	J. Moffatt	8	1	2	331
	Buckland (Hartswood)	R. W. Clutton	5	1	0½	174
	Reigate Hill (Nutwood Lodge)	H. E. Gurney	5	1	0	440
	Upper Gatton (Upper Gatton Park)	F. Druce	5	1	0	600
10	Merstham (Rockshaw)	W. Gardiner	5	1	0	475
	Harp's Oak Cottage	R. C. Grant	5	1	0	454
	Chipstead (Shabden Park)	J. Crerar	5	1	0	550
	Chaldon (The Rectory)	Rev. G. E. Belcher	5	1	0	542
	Caterham (Metropolitan Asylum)	G. S. Elliott, M.D.	5	1	0	610
15	Westerham (Hill Estate)	W. Morris	5	1	0	539
	Westerham (The Town)	W. Morris	5	1	0	380
	Knockholt Beeches (Field Gauge)	W. Morris	5	1	0	785
	Knockholt Beeches (Tower Gauge)	W. Morris	5	24	6	812
	Sevenoaks (St. Johns Hill)	W. W. Wagstaffe	5	1	10	380
20	Warlingham (The Vicarage)	Rev. F. R. Marriott	5	1	0	614
	Kenley (Hazelea)	Mrs. Carr-Dyer	5	1	0	282
	Sanderstead (The Red House)	Capt. Carpenter, R.N.	5	1	0	320
	Purley (Tudor Cottages)	J. Bonwick	5	1	0	216
	Burgh Heath (Sutton Water Co.)	J. D. Grant	5	1	0	580
25	Leatherhead (Downside)	A. Tate	5	1	0	250
	D'Abernon Chase	Sir W. Vincent, Bart.	5	1	0	280
	Oxshott (Beverstone)	W. H. Dines	5	1	0	212
	Banstead (The Larches)	Rev. C. J. Taylor	8	1	0	488
	Sutton (Sutton Water Co.)	J. D. Grant	5	1	0	110
30	Carshalton (Sewage Works)	W. W. Gale	5	1	0	118
	Wallington (Maldon Road)	F. Campbell-Bayard	5	4	1	140
	Beddington (Riverside)	S. Rostron	5	1	0	120
	Waddon (Waddon House)	P. Crowley	5	1	0	156
	Croydon (Brimstone Barn)	Croydon Corporation	5	1	0	130
35	Croydon (Waddon New Road)	Croydon Corporation	5	1	0	146
	Croydon (Duppas House)	Baldwin Latham	8	1	0	158
	Croydon (Whitgift)	A. E. Watson	5	1	0	191

No.	Stations.	Observers.	Size of Gauge.	Height above Ground.		Height of Stat. ab. Sea-level.
			IN.	FT.	IN.	FT.
	Croydon (Woburn Road)	M. L. Craven	5	1	1	178
	Croydon (Windmill Road)	A. Malden	5	1	6	174
40	Croydon (Park Hill Rise)	H. F. Parsons, M.D.	5	1	0	250
	Addington Hills (The Reservoir)	Croydon Corporation	8	0	9	473
	Addington (Park Farm)	W. Whalley	5	1	0	268
	Addington (Pumping Station)	Croydon Corporation	8	1	0	331
	West Wickham (Wickham Court)	Sir H. F. Lennard, Bt.	5	1	2	300
45	Hayes Common (The Warren)	Miss Akers	5	1	0	296
	Keston (Bradfield)	A. Hill	5	1	0	350
	Farnborough (Feniton)	Miss Percy	5	1	0	376
	Orpington (Kent Water Co.)	W. Morris	5	1	0	220
	Farningham Hill (Hill House)	A. J. Waring	5	3	0	300
50	Southfleet (Kent Water Co.)	W. Morris	5	1	0	82
	Chislehurst (Hawkwood)	Miss Edlmann	5	1	0	300
	Bickley (The High Field)	J. Batten	5	1	2	295
	Bromley (The Palace)	Coles Child	5	1	0	187
	Bromley Common (Elmfield)	Rev. J. P. Faunthorpe	5	0	9	240
55	Beckenham (Oakwood Avenue)	H. Dolling-Smith	5	1	0	184
	South Norwood (Apsley Road)	W. H. Cullis	5	1	0	125
	Wimbledon (Sewage Works)	C. H. Cooper	5	1	0	58
	Wimbledon (Mount Ararat)	T. Devas	12	3	0	157
	Raynes Park (Pumping Station)	C. H. Cooper	5	1	0	47
60	New Malden (Sewage Works)	T. V. H. Davison	5	1	0	45
	Esher (Sewage Works)	A. J. Henderson	5	1	0	40
	West Molesey (Chelsea W. Co.)	R. Hack	5	1	0	32
	Surbiton (Seething Wells)	R. Hack	10	0	6	25
	Kingston (Sewage Works)	T. Stevens	5	1	0	25
65	Putney Heath (The Reservoirs)	R. Hack	5	1	0	180
	Wandsworth Com. (Patten Road)	F. J. Brodie	5	1	0	100
	Streatham (Woodfield Avenue)	F. Jordan	5	1	0	120
	West Norwood (Thornlaw Road)	W. Marriott	5	1	0	220
	Up. Norwood (Dulwich-wood Park)	J. P. Caldicott	5	1	2	276
70	Forest Hill (Dartmouth Road)	L. W. F. Behrens	5	1	0	220
	Forest Hill (S. & V. Water Co.)	J. W. Restler	5	1	0	344
	Sidcup (Hatherley Road)	Lionel Burrell, M.D.	5	1	2	160
	Wilmington (Kent Water Co.)	W. Morris	5	1	0	25
	Dartford (West Hill House)	Lieut-Col. C. N. Kidd	5	1	3	100
75	Eltham (High Street)	W. Morris	5	1	0	245
	Greenwich (Royal Observatory)	Astronomer Royal	8	0	5	155
	Deptford (Kent Water Co.)	W. Morris	5	1	0	20
	Nunhead (S. & V. Water Co.)	J. W. Restler	5	4	0	176
	Brixton (Acre Lane)	F. Gaster	8	1	0	77
80	Battersea (S. & V. Water Co.)	J. W. Restler	5	3	0	21

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jns.H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·14	·18	·14	·12	·12	·14	·14	·12	·12	·12	·12	·13	·15	·16	·12	·15	·13	MONTHLY GAUGE.	MONTHLY GAUGE.	·20	·14	·10	·13	·08	MONTHLY GAUGE.	·10
2	·20	·08	·13	·12	·12	·12	·07	..	·13	·10	·08	·08	·03	·02	·07	·14	..			·08	·05	·08	·09	·12		·11
3	·02	·02	·02	·01	·02	·02	..	·01	·01	·02	·03	·02	·01	..	..	·04	..			·02	·03	·01	..	..		..
4	..	..	..	..	·01	·01	..	·01	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	·02	..	..	..	..	..	..	·02	..	..	·01	..	·03	..	..	..			..	..	..	..	..		..
6	·05	·05	·06	·03	·03	·03	·05	·06	·05	·07	·04	·05	·04	·03	·05	·03	..			·04	·04	·02	·03	·02		·02
7	·04	·06	·05	·07	·04	·04	·07	..	·04	·05	·04	·04	·09	·04	·06	·07	·29			·12	·01	·09	·09	·07		·04
8	..	..	..	..	·01	·01	..	·03	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	·03	·02	·02	·03	·02	·05	·03	·02	·08	·04	·03	..	..	..			..	..	·04	·04	·15		..
10	·23	·21	·24	·20	·19	·23	·20	·17	·17	·16	·20	·20	·08	·20	·20	·15	·15			·15	·20	·18	·21	·20		·19
11	·45	·50	·44	·38	·30	·36	·36	·39	·47	·42	·40	·46	·41	·48	·48	·33	·22			·27	·38	·35	·33	·28		·32
12	·16	·28	·21	·24	·19	·20	·21	·20	·23	·42	·26	·49	·46	·67	·48	·38	·22			·24	·42	·39	·48	·72		·43
13	·25	·25	·33	·38	·36	·38	·34	·36	·37	·38	·41	·41	·35	·23	·45	·53	·52			·48	·43	·38	·42	·45		·30
14	..	·06	..	..	..	..	..	·02	·05	..	..	·04	..	·07	..	..	..			·03	..	..	..	·08		..
15	·35	·35	·40	·42	·43	·48	·44	·35	·35	·44	·45	·47	·43	·42	·56	·65	·61			·45	·43	·33	·42	·16		·33
16	·14	·18	·21	·14	·13	·14	·15	·16	·16	·24	·16	·25	·22	·20	·27	·15	..			·17	·23	·28	..	·24		·30
17	·20	·20	·13	·15	·15	·16	·19	·15	·14	·14	·16	·14	·13	·14	·14	·18	·36			·20	·15	·12	·13	·13		·12
18	·02	·07	·04	·01	·01	·01	·01	·03	·02	·05	·02	·04	·04	·05	·06	·02	..			·02	·14	·02	·04	·03		·02
19	·10	·18	·10	·12	·06	·08	·08	·08	·10	·15	·09	·14	·09	·13	·16	·08	·03			·01	·04	·04	·07	·06		·06
20	·44	·55	·47	·44	·30	·42	·45	·39	·44	·47	·40	·47	·43	·49	·55	·45	·37			·22	·46	·23	·37	·20		·33
21	·23	·25	·27	·15	·07	·12	·14	·12	·13	·15	·15	·15	·18	·15	·23	·08	·10			·07	·16	·10	·16	·08		·25
22	·03	·04	·04	..	·03	·06	·02	·04	·02	·06	·03	·02	·02	·08	·04	·03	..			·06	·06	·03	·06	·03		·04
23	·03	·01	·04	·10	·07	·05	..	..	·09	·02	·05	·06	·06	..	·07	·08	..			·03	·05	·05	..	·07		·04
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
28	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	·02	..	·06			..	..	..	·04	..		..
29	·06	·05	·05	·03	·03	·02	·05	·06	·08	·07	·04	·05	·08	·08	·06	·08	·08			·06	·09	·04	·05	·06		·07
30	..	..	..	·02	·01	·01	..	·01	·01	·01	·01	·01	..	..	..	·01	..			..	..	..	..	..		..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
*	3·14	3·59	3·37	3·16	2·70	3·11	3·00	2·78	3·25	3·57	3·16	3·82	3·34	3·70	4·07	3·63	3·14	3·94	2·23	2·92	3·51	2·88	3·16	3·23	3·23	3·07
†	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·07	·04	·11	·07	·08	·08	·07	·06	·07	·08	·07	·07	·06	·08	·09	·10	·11	·09	·11	·09	·10	·09	·11	·06	·08	·08
2	·07	·06	·06	·07	·09	·09	·08	·08	·08	·07	·07	·08	·07	·08	·07	·12	·11	·09	·08	·06	·08	·09	·09	·07	·08	·08
3	..	..	·01	·01	..	..	·01	..	..	·01	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..
4	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	·01	..	·01	..	..	..	..	..	..	·01	·01	..	..	..	..	..	·01	..	·02	..	·01	..	..	..	..	..
6	..	..	·01	·01	..	·01	·01	..	·01	·01	..	..	..	..	..	..	·01	·01	·01	..	·01	..	·03	·04	·02	..
7	·03	·03	·04	·03	·03	·02	·03	..	·02	·03	·02	·03	·02	·03	·06	·09	·07	·03	·06	·03	·02	·03	·02	..	·05	·04
8	..	..	·01	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	·02	..	..	..	..	·01	..	..	..
9	..	..	·01	·01	·03	·03	·04	·04	·04	·06	·08	·07	·03	·12	·03	·03	·02	·03	·03	·01	·01	..	..	·06	..	·02
10	·12	·13	·18	·14	·14	·16	·14	·15	·13	·18	·17	·17	·16	·17	·19	·20	·20	·11	·22	·18	·15	·12	·10	·02	·16	·15
11	·27	·27	·36	·24	·26	·27	·24	·15	·22	·25	·27	·22	·22	·22	·25	·29	·29	·37	·26	·26	·28	·32	·35	·21	·17	·19
12	·64	·63	·51	·59	·60	·56	·49	·48	·53	·43	·48	·48	·48	·62	·54	·59	·67	·66	·53	·45	·60	·59	·41	·35	·50	·47
13	·40	·38	·41	·41	·41	·40	·37	·31	·39	·37	·35	·39	·39	·40	·38	·42	·42	·43	·42	·32	·37	·38	·42	·31	·34	·51
14	·03	..	..	..	..	..	·02	..	..	·01	..	·01	..	..	..	..	..	..	·01	..	·01	..	..	..	..	..
15	·33	·35	·43	·38	·36	·39	·37	·28	·39	·37	·35	·41	·41	·37	·36	·41	·42	·46	·37	·35	·39	·39	·38	·42	·42	·46
16	..	·10	·19	·12	·14	·14	·15	·15	·13	·14	·23	·18	·13	·17	·16	·18	·16	·20	·23	·15	·16	·19	·11	·14	·20	·16
17	·20	·09	·13	·09	·10	·10	·09	·09	·10	·09	·10	·10	·09	·08	·10	·12	·13	·08	·11	·09	·10	·11	·08	·04	·08	·08
18	·01	..	·02	·01	·01	·01	·01	..	·01	·01	·02	·01	..	·01	·01	·02	·03	·01	·02	·01	·01	·01	..	..	..	·09
19	·05	·04	·06	·04	·05	·06	·06	·04	·06	·05	·07	·06	·04	·08	·05	·05	·07	·05	·05	·03	·04	·05	·03	·02	·05	..
20	·24	·19	·34	·19	·20	·24	·19	·12	·22	·21	·25	·22	·20	·27	·27	·34	·37	·34	·30	·20	·21	·34	·21	·12	·14	·22
21	·14	·15	·26	·18	·20	·22	·18	·15	·18	·20	·02	·21	·18	·17	·17	·20	·19	·17	·19	·10	·10	·14	·10	·05	·10	·13
22	·03	·02	·02	·04	·05	·03	·04	..	·03	·03	·05	·02	·03	·03	·02	·01	·04	·02	·03	·04	·04	·07	·02	·02	·05	·03
23	·02	·02	·03	·04	·04	·05	·05	·08	·05	·06	·05	·08	·06	·06	·06	·11	·08	·07	·08	·05	·07	·01	·12	·04	·06	·08
24	·03	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	·02	·02	..	·01	·01	..	..	·02	..	·01	..	·01	·01	..	·02	..	·03	..	·01	..	·03	..	..	·03
29	..	·08	·07	·07	·05	·06	·07	·06	·08	·07	·09	·08	·08	·07	·08	·10	·08	·10	·08	·09	·08	·08	·08	·09	·10	·08
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	·01	..	..	·02	·01	·02	·01	..	..	..
31	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..
*	2·69	2·59	3·30	2·77	2·84	2·93	2·72	2·24	2·74	2·77	2·75	2·90	2·65	3·04	2·91	3·40	3·51	3·34	3·24	2·53	2·86	3·03	2·71	2·06	2·60	2·90
†	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm.rd.)	Forest Hill (S&VWC)	Sideup	Wilmington	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·06	·08	·07	·07	·13	·06	·04	·07	·02	·06	·06	·07	·50	·12	·05	·07	·09	·06	·08	·05	·03	·06	·07	·06	·06	·06
2	·08	·06	·07	·01	..	·05	·04	·05	·05	·05	·05	·06	·03	·05	·10	·09	·04	·08	·05	·10	·11	·10	·11	·09	·05	·13
3	..	..	·01	..	..	·01	·01	·02	..	·01	·02	·01	·02	·03	·02	·01	·02	·01	·02	·01	·02	·02	·01	..	..	·01
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	·04	..	..	..	..	·01	..	..	..	..	..	·01	..	..	·01	·01	..	..	..	·01	·02	·02	..	..
7	·05	·07	..	·01	·03	·01	..	·02	·02	·03	·03	·02	·02	·03	·03	·01	·02	·02	·02	·02	·03	·02	·04	·01	·06	·02
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..
9	..	·02	·03	·08	·01	..	..	·01	..	..	..	..	..	·03	..	..	·01	·02	..	·11	·05	·04	..	..	..	·01
10	·02	·19	·19	·13	·16	·16	·13	·15	·11	·16	·14	·14	·17	·20	·12	·15	·15	·14	·15	·14	·13	·14	·18	·07	·15	·11
11	·15	·22	·20	·20	·22	·22	·27	·29	·24	·33	·32	·28	·35	·27	·30	·27	·20	·22	·19	·21	·21	·18	·17	·16	·10	..
12	·45	·30	·46	·34	·40	·26	·23	·25	·30	·34	·28	·31	·28	·23	·21	·21	·16	·26	·25	·26	·23	·25	·34	·40	·30	·29
13	·46	·39	·47	·36	·35	·40	·38	·38	·31	·42	·35	·42	·42	·41	·42	·44	·37	·46	·46	·47	·45	·46	·49	·42	·45	·44
14	..	..	..	..	..	·05	..	·01	..	·02	..	..	·22	..	..	..	·02	..	..	·02	·06	..	..	..	..	..
15	·45	·39	·48	·36	·40	·37	·37	·37	·20	·34	·36	·37	·21	·39	·39	·43	·30	·40	·35	·36	·36	·49	·44	·39	·41	·44
16	·16	·13	·15	·10	·13	·15	·14	·13	·11	·14	·17	·14	·28	·12	·17	·20	·07	·17	·15	·12	·17	·16	·13	·15	..	·18
17	..	·08	·10	·10	·12	·13	·14	·13	·12	·12	·16	·14	·15	·16	·15	·16	·14	·12	·12	·11	·12	·13	·09	·06	·08	·10
18	..	·02	·01	·11	..	..	..	·02	..	·02	·02	..	·01	·02	·01	·01	·01	..	·01	..	..	·01	·01	..	..	..
19	·08	·05	·07	·03	·04	·07	·07	·04	·04	·04	·03	·04	·07	·03	·05	·08	·05	·05	·06	..	·05	·06	·08	·03	..	·07
20	·20	·18	·22	·09	·17	·13	·15	·17	·09	·19	·18	·20	·21	·25	·18	·17	·15	·17	·14	·19	·13	·15	·17	·12	·15	·14
21	·12	·11	·15	·08	·17	·03	·05	·09	·04	·12	·09	·10	·08	·11	·07	·05	·07	·12	·10	·14	·12	·10	·13	·07	·05	·09
22	·05	·03	·05	..	·05	..	·02	·03	·02	·03	·03	·02	·03	·04	·03	·04	·04	·04	·06	·05	·02	·04	·08	·03	..	·01
23	·07	·05	·08	·09	..	·03	·04	·04	·02	·02	..	·01	·02	·04	·04	·04	·03	·06	·06	·09	·10	·07	·09	·02	·08	·10
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	·02	..	..	·02	·02	·02	·01	·03	·03	·01	..	·03	..	·02	·01	·01	·03	·02	·02	·02	·01	·02	..	·02
29	·09	·09	·09	·08	·10	·13	·11	·10	·06	·08	·10	·08	·15	·15	·14	·13	·12	·11	·11	·10	·13	·12	·10	·10	·15	·11
30	..	..	·01	·01	..	·01	·01	·02	..	·02	..	·01	..	·02	·01	·01	·01	·01	..	·02	·02	·02	·01	..	..	·02
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*	2·49	2·46	2·97	2·25	2·48	2·29	2·22	2·42	1·76	2·57	2·42	2·43	3·22	2·74	2·49	2·59	2·09	2·54	2·41	2·59	2·56	2·67	2·77	2·22	2·09	2·35
†	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

* The figures in this row give the totals for the month. † The totals from January 1st.

January, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·09	·05	·13	·05	·05
2	·11	·15	·02	·13	·11
3	·01	·01	..	..	·02
4	..	..	..	·01	..
5	·01	..	..	..	..
6	·01	..	..	..	..
7	·02	·02	..	·01	·04
8	..	..	..	..	..
9	·05	·09	·02	..	..
10	·12	·12	·11	·13	·10
11	·17	·16	·14	·23	·26
12	·23	·20	·13	·23	·14
13	·45	·40	·38	·45	·35
14	·05	..	..	..	..
15	·36	·37	·36	·44	·35
16	·13	·11	·08	·21	·08
17	·13	·12	·12	·14	·11
18	..	·01	..	·01	..
19	·07	·06	·05	·10	·04
20	·15	·12	·05	·17	·10
21	·10	·07	·04	·04	·04
22	·03	·03	·02	·01	·02
23	·05	·05	·05	·08	·03
24	..	..	..	..	..
25	..	..	..	..	..
26	..	..	..	..	..
27	..	..	..	..	..
28	·03	·01	..	·01	·02
29	·14	·14	·13	·10	·12
30	·01	·01	..	·02	..
31	..	..	..	..	..
*	2·52	2·30	1·83	2·57	1·98
†	..	..	..	..	..

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(January, 1899.)

The month has been wet and warm, sunny and stormy. It is the sunniest January in the Wallington sunlight record. As instances of the warmth, it may be mentioned that strawberries were in bloom at Coulsdon on the 12th, larks were singing on the 20th at Chislehurst, a pear tree was in bloom on the 21st at Sidcup, and the winter aconite bloomed at Croydon on the 24th. Myrtles were untouched by frost at Chislehurst, where also violets, yellow jasmine, and primroses flowered throughout the month, and geraniums at Sevenoaks. Great gales occurred on the 12th, 19th, 21st, and 22nd, and some amount of damage was done in the district. Slight snow fell on the 2nd in most places, at Croydon there was a thunderstorm on the 9th, at Nutfield lightning was seen on the 16th, a lunar halo was seen at Wallington on the 19th, and a rainbow at Nutfield on the 23rd. A hailstorm occurred at Croydon and Farnborough on the 10th. At Croydon (Whitgift) the maximum in the shade was 50° and above on eleven days, whilst the minimum in the shade was at or below 32° on five days. The mean temperature of the month is about 5° above the average, and was at Croydon (Whitgift) and Wallington 42·5°, at Croydon (Duppas House) 42·2°, at Waddon 42·1°, at Redhill 41·1°, and at Chipstead 40·7°. The rainfall is about ·75 in. in excess of the average, and colds, influenza, and rheumatism have been somewhat prevalent. There were recorded at Wallington 70 hours of sunlight, which is 9 per cent. above the January mean of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc.,
Hon. Sec.

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	Reigate Hill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jus. H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	..	..	..	..	..	MONTHLY GAUGE.	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
4	·36	·34	·33	·30	·38	·41	·42	·40	·36	·36	·35	·40	·43	·43	·42	·35	·42			·47	·38	·35	·35	·43		·35
5	·02	·03	..	·09	·02	·02	·02	·04	·07	·03	·04	..	·03	·23	·06	·02	·02			·02	·01	·05	..	·06		·02
6	·62	·60	·52	·38	·35	·36	·37	·30	·35	·35	·41	·35	·36	·15	·36	·29	·20			·19	·37	·33	·35	·37		·49
7	·23	·30	·22	·12	·13	·13	·18	·19	·20	·17	·16	·18	·23	·16	·14	·16	·17			·15	·11	·16	·22	·24		·22
8	·67	·56	·81	·68	·55	·69	·74	·69	·69	·75	·62	·70	·70	·72	·70	·68	·61			·62	·76	·58	·74	·66		·77
9	·17	·18	·17	·15	·11	·15	·15	·16	·18	·17	·15	·17	·18	·18	·19	·12	·10			·08	·11	·15	·15	·12		·17
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	·13	·16	·17	·11	·09	·13	·16	·17	·13	·15	·11	·18	·13	·12	·11	·12	·08			·04	·10	·10	·13	·09		·18
12	·36	·45	·44	·47	·43	·47	·49	·37	·40	·44	·46	·42	·39	·48	·47	·43	·26			·29	·37	·25	·34	·25		·39
13	·14	·13	·15	·11	·14	·13	·15	·09	·08	·06	·14	·06	·03	·09	·13	·05	..			·06	·14	·02	·05	·06		·10
14	·04	·06	·04	·03	·03	·04	·02	·02	·04	·05	·05	·07	·06	·05	·09	·06	·10			·02	·08	·07	..	·04		·03
15	·38	·40	·38	·39	·38	·38	·39	·42	·37	·39	·39	·40	·42	·39	·38	·33	·32			·40	·40	·36	·38	·38		·12
16	·01	·01	..	..	·01	·01	..	..	..	..	..	..	..	·01	..	..	..			·01	·02	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	·01		..
18	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	·06	·04	·03	..	·01	·01	..	..	..	..	..	·01	·03	..	..	·01	..			..	..	·02	·03	·05		·04
20	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..			..	..	..	..	..		..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
*	3·19	3·26	3·26	2·83	2·64	2·94	3·09	2·85	2·87	2·92	2·88	2·95	2·99	3·01	3·05	2·62	2·28	2·71	1·93	2·35	2·85	2·44	2·74	2·76	3·04	2·88
†	6·33	6·85	6·63	5·99	5·34	6·05	6·09	5·63	6·12	6·49	6·04	6·77	6·33	6·71	7·12	6·25	5·42	6·65	4·16	5·27	6·36	5·32	5·90	5·99	6·27	5·95

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	·37	·37	·45	·29	·35	·35	·40	·34	·40	·37	·34	·34	·37	·36	·39	·31	·38	·43	·38	·39	·45	·36	·43	·35	·36	·46
5	..	..	·01	·04	·03	·03	·02	·03	..	·03	·03	·04	·01	·02	·02	·11	·03	·02	·03	·01	·04	·03	·02	·13	·03	·02
6	·37	·40	·45	·38	·31	·28	·38	·23	·27	·28	·27	·25	·25	·30	·27	·26	·29	·26	·28	·30	·21	·18	·20	·05	·19	·23
7	·18	·17	·20	·17	·17	·20	·18	·21	·18	·21	·19	·20	·19	·19	·19	·24	·19	·17	·08	·09	·14	·23	·18	·15	·15	·18
8	·56	·45	·73	·52	·59	·64	·59	·54	·62	·67	·67	·63	·62	·70	·74	·79	·75	·73	·69	·57	·59	·62	·67	·46	·47	·62
9	·15	·14	·16	·12	·11	·12	·10	·08	·10	·11	·11	·11	·11	·11	·12	·15	·15	·13	·13	·12	·12	·13	·12	·08	·09	·09
10	·03	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..	..
11	·08	·12	·17	·14	·15	·13	·12	·12	·12	·14	·14	·14	·08	·13	·12	·12	·12	·12	·13	·09	·10	·09	·06	·04	·08	·09
12	·24	·22	·33	·22	·23	·25	·21	·20	·22	·21	·23	·23	·22	·22	·28	·28	·30	·32	·28	·18	·23	·26	·18	·11	·15	·19
13	·04	·04	·11	·12	·09	·08	·06	·05	·06	·05	·06	·06	·07	·04	·04	·06	·05	·05	·07	·08	·17	·17	·09	·05	·04	·02
14	·01	·05	·03	..	·01	·01	·02	·02	·01	·01	·01	·02	·01	·01	·05	·07	·10	·06	·04	·08	·05	·03	·03	..	·03	·02
15	·30	·30	·36	·33	·35	·35	·35	·35	·36	·34	·35	·36	·35	·37	·35	·41	·40	·40	·37	·36	·33	·33	·35	·36	·37	·35
16	..	..	·01	·01	..	..	..	..	·01	·01	·01	·01	..	..	..	..	·01	..	·02	..	..	..	·01	..	..	..
17	..	·01	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
18	..	..	..	·01	..	..	..	..	..	·01	..	..	..	·01	..	..	·01	..	..	..	..	..	·01	..	..	..
19	·03	·02	·04	·03	·03	·02	·02	..	·02	·03	·02	·02	·01	·02	·03	..	·03	..	·02	·02	·01	..	..	..	·03	·03
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	·01	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
27	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
*	2·36	2·30	3·05	2·38	2·42	2·46	2·45	2·17	2·37	2·49	2·44	2·41	2·29	2·48	2·62	2·80	2·83	2·69	2·52	2·30	2·46	2·44	2·38	1·78	1·99	2·30
†	5·05	4·89	6·35	5·15	5·26	5·39	5·17	4·41	5·11	5·26	5·19	5·31	4·94	5·52	5·53	6·20	6·34	6·03	5·76	4·83	5·32	5·47	5·09	3·84	4·59	5·20

* The figures in this row give the totals for the month. † The totals from January 1st.

Daily Rainfall.

The 80 years (1816–95) mean at Greenwich for February is 1·99 in.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm.rd.)	Forest Hill (S&VWC)	Sidcup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	·43	·36	·37	·39	·40	·40	·42	·38	·36	·40	·39	·37	·43	·35	·37	·45	·37	·36	·39	·36	·35	·34	·43	·37	·65	·38
5	·03	·04	·06	·03	..	·01	..	·04	·02	·02	·02	·02	..	·03	·03	·01	·02	·02	..	·03	·04	·04	·03	·03	..	·03
6	·22	·26	·22	·20	·26	·31	·39	·38	·39	·39	·43	·40	·46	·35	·35	·33	·25	·39	·22	·21	·19	·16	·18	·17	·10	·21
7	·18	·17	·17	·13	·14	·15	·13	·15	·12	·15	·13	·13	·16	·13	·14	·17	·14	·17	·11	·15	·11	·10	·16	·18	·18	·15
8	·59	·63	·58	·40	·51	·25	·31	·36	·25	·32	·29	·35	·36	·29	·30	·31	·32	·38	·36	·43	·32	·33	·52	·40	·37	·42
9	·10	·11	·10	·07	·10	·09	·11	·12	·11	·19	·20	·15	·18	·20	·17	·13	·10	·09	·08	·10	·09	·09	·09	·08	·05	·07
10	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	·08	·11	·09	·05	·13	·08	·08	·13	·06	·10	·11	·08	·10	·12	·08	·09	·11	·09	·08	·13	·10	·08	·09	·06	..	·04
12	·18	·21	·22	·12	..	·14	·18	·21	·16	·22	·18	·24	·20	·18	·16	·17	·17	·19	·16	·20	·15	·16	·18	·12	·18	·15
13	·03	·05	·04	·02	·30	..	·02	·05	·01	·07	·15	·04	·18	·21	·04	·01	·03	·08	·10	·07	·10	·11	·03	·13	·09	·02
14	..	·04	·03	·03	..	·26	·18	·17	·19	·19	·05	·30	·07	·03	·16	·20	·10	·01	..	·02	·03	·02	·03	·01	·02	·02
15	·35	·35	·34	·30	·34	·30	·29	·29	·28	·30	·32	·30	·36	·32	·29	·31	·33	·31	·33	·34	·33	·33	·37	·32	·34	·33
16	..	..	·01	..	..	·01	·01	·02	..	..	..	..	..	·01	..	·01	..	..	..	..	..	·01	..	..	..	..
17	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	·01	..	·01	·02	..	..	..
19	·02	·02	·02	·02	..	·01	·03	·03	·01	·03	·03	·02	·02	·01	·02	·01	·03	·02	..	·03	·01	·01	·02	..	..	·02
20	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	·01	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..
*	2·21	2·35	2·26	1·76	2·18	2·03	2·15	2·35	1·96	2·40	2·30	2·40	2·52	2·23	2·11	2·21	1·97	2·11	1·83	2·12	1·83	1·80	2·17	1·87	1·98	1·84
†	4·70	4·81	5·23	4·01	4·66	4·32	4·37	4·77	3·72	4·97	4·72	4·83	5·74	4·97	4·60	4·80	4·06	4·65	4·24	4·71	4·39	4·47	4·94	4·09	4·07	4·19

February, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..
2	..	..	..	..	..
3	..	..	..	..	..
4	·41	·33	·34	·30	·34
5	·01	·03	·03	·07	..
6	·21	·21	·24	·28	·24
7	·13	·11	·11	·14	·10
8	·33	·28	·22	·31	·22
9	·09	·08	·06	·12	·12
10	..	..	..	..	..
11	·08	·07	·03	·10	·06
12	·18	·15	·11	·18	·13
13	·09	·09	·05	·02	·04
14	·05	·06	·09	·22	·11
15	·32	·32	·32	·30	·29
16	..	..	..	..	·01
17	..	..	..	..	..
18	·01	..	..	..	..
19	·02	·01	·01	..	..
20	..	..	..	·01	..
21	..	..	..	..	..
22	..	..	..	..	..
23	..	..	..	..	..
24	..	..	..	..	..
25	..	..	..	..	..
26	..	..	..	..	..
27	..	..	..	..	..
28	..	..	..	..	..
*	1·93	1·74	1·61	2·05	1·66
†	4·45	4·04	3·44	4·62	3·64

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(February, 1899.)

The month may be divided into three portions—from 1st to 3rd fine and frosty, then to the 15th wet and stormy, and then fine and frosty. The 10th was an exceedingly hot day, probably the hottest February day on record, the maximum in the shade being well over 60° throughout the district. In the Wallington record, commencing in 1886, the mean maximum in shade and the total sunlight are the highest February values, and the mean temperature is the highest February value with the exception of February, 1897, and the total rainfall with the exception of February, 1893. The month has been unhealthy, influenza and rheumatism being very prevalent. Notwithstanding the warmth, flowers, both wild and garden, are somewhat backward. The yellow crocus flowered at Croydon on the 10th, and the lesser celandine on the 18th; whilst at Warlingham the ground ivy flowered on the 18th. At Croydon the maximum in shade was 50° and upwards on ten days, and below 40° on seven days; whilst the minimum in shade was 40° and above on six days, and below 30° on ten days. The rainfall is nearly three-quarters of an inch above the average. In the well of the Sutton Waterworks on the 28th, the water was 3 ft. 5 in. higher than on the same day last year. The mean temperature of the month is about 3° above the average, and was at Croydon (Duppas House) 42·5°, at Croydon (Whitgift) 42·4°, at Wallington 42·2°, at Waddon 42·1°, at Chipstead 41·8°, and at Redhill 40·1°. Lunar halos were seen at Wallington on the 17th, at Wallington and Croydon on the 23rd, and at Nutfield on the 25th. There were recorded at Wallington 117·5 hours of sunlight, which is 19 per cent. above the February mean of the ten years 1886–95.

E. Campbell Bayard, P.R.Met.Soc., *Hon. Sec.*

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for March is 1·52 in.* **March, 1899.**

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	Reigate Hill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jos.H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	..	..	..	..	..	MONTHLY GAUGE.	..
2	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
4	·03	·04	..	..	..	..	·01	..	..	·03	·02	·01	..	·05	·16	·01	..			·05	·07	·12	·07	·04		..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
8	·22	·22	·25	·17	·13	·16	·18	·08	·18	·22	·16	·23	·31	·20	·23	·25	·19			·23	·22	·24	·30	·30		·18
9	..	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..	·02	..			·03	·01	..	·01	..		·01
10	..	·01	..	·01	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..			..	..	..	..	..		..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
20	..	·02	·02	..	..	..	..	..	..	·01	..	..	..	..	..	·02	..			·06	·01	..	..	..		·03
21	·07	·06	·10	·07	·06	·06	·07	·08	·07	·03	·04	·06	·09	..	·08	·04	..			·04	·08	·03	·12	·13		·12
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
23	·01	·01	..	·01	·02	·01	..	·01	·02	..	·02	·01	·02	..	..	..	..			..	·02	..	·02	..		·01
24	..	..	..	..	..	..	..	·01	..	·04	..	·01	..	..	..	..	..			·02	..	..	..	..		..
25	·24	·30	·28	·26	·27	·31	·34	·24	·25	·29	·36	·34	·27	·41	·39	·42	·50			·40	·34	·30	·32	·35		·21
26	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	·01	..		..
27	..	·01	·03	..	·01	·01	..	..	..	·02	·01	·01	..	·01	..	..	..			·01	..	..	..	..		·01
28	·02	·02	·03	·04	·04	·04	·04	·05	·05	·04	·04	·04	·05	..	·07	..	..			·02	·07	·03	·03	·02		·03
29	..	..	..	..	..	..	..	..	..	..	..	..	..	·03	..	..	·06			..	..	..	·01	·03		..
30	·08	·06	·08	·07	·07	·07	·07	·08	·07	·09	·05	·09	·07	·07	·08	·07	·04			·05	·06	·04	·06	·05		·06
31	..	..	..	·01	..	..	..	·02	·01	..	..	..	..	..	..	..	..			..	..	..	..	·03		..
*	·67	·76	·79	·64	·63	·68	·71	·57	·65	·77	·71	·82	·81	·77	1·01	·83	·79	·86	·48	·91	·88	·76	·95	·95	·76	·66
†	7·00	7·61	7·42	6·63	5·97	6·73	6·80	6·20	6·77	7·26	6·75	7·59	7·14	7·48	8·13	7·08	6·21	7·51	4·64	6·18	7·24	6·08	6·85	6·94	7·03	6·61

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·02	..	..	..	..	..	..	..
2	..	..	·01	..	..	..	..	..	..	·01	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
3	..	..	..	·01	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..	·01	..	..	..	..	..	..	..
4	..	..	·01	·06	·01	·03	·03	..	·02	·02	·02	·02	·02	·02	·02	·04	·01	..	..	..	·02	..	·06	..	·02	..
5	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	·15	·10	·24	·16	·18	·22	·22	·30	·22	·24	·23	·23	·19	·23	·32	·23	·23	·26	·22	·14	·17	·25	·22	·20	·13	·25
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
11	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
13	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
15	..	..	..	·01	..	..	..	..	..	..	·01	..	..	..	..	..	·01	..	·02	..	..	..	..	..	..	..
16	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	·02	..	..	..	..	..	..	..	·01	..	..	..	·01	·01	..	·01	..	..	..	..	..	..	..	..	..
18	·03	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	·01	·01	·01	..	..	..	..	..	..	..	..	..	..	·01	..	..	·04	..	·02	·02	..	·07	·01	·02	..
21	·04	·05	·13	·12	·09	·09	·09	·12	·13	·10	·11	·16	·13	·12	·13	..	·13	·08	·08	·10	·09	·09	·07	·03	·13	·17
22	·06	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	·02	·01	..	..	..	..	..	..	..	·01	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..
24	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
25	·17	·13	·27	·19	·20	·25	·22	·20	·22	·22	·21	·20	·18	·23	·23	·40	·29	·32	·30	·20	·29	·25	·25	·20	·22	·24
26	..	..	·01	..	..	..	..	..	..	·01	..	·01	..	..	·01	..	..	..	..	..	·01	..	·01	·02	..	..
27	..	·01	·01	..	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..	..	..	..	..	·01	..	..	..
28	·03	..	·02	·02	·01	·02	·02	·02	·02	·02	·02	·02	·02	·02	·02	·03	·02	·02	..	·01	·02	·02	·01	..	·02	·03
29	..	·02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	·10	·10	·09	·08	·08	·08	·08	·06	·08	·09	·09	·10	·10	·09	·09	·08	·07	·07	·11	·14	·07	·06	·07	·10	·08	·09
31	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	·02	..	..	..	..	·01	..	..	..	..	·01
*	·59	·46	·83	·67	·57	·69	·66	·70	·69	·76	·70	·75	·64	·74	·88	·80	·80	·79	·76	·61	·71	·67	·79	·56	·62	·79
†	5·64	5·33	7·18	5·82	5·83	6·08	5·83	5·11	5·80	6·02	5·89	6·06	5·58	6·26	6·41	7·00	7·14	6·82	6·52	5·44	6·03	6·14	5·88	4·40	5·21	5·99

* The figures in this row give the totals for the month. † The totals from January 1st.

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for March is 1·52 in.* **March, 1899.**

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm. rd.)	Forest Hill (S&VWC)	Sideup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	·02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	·03	·04	..	..	..	..	·07	·08	..	·02	·02	..	..	·04	..	..	·01	·01	..	..	..	..	·04	·03	..	·02
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	·18	·16	·27	·13	·15	·04	·07	·09	·05	·09	·08	·11	·10	·09	·05	·05	·05	·06	·08	·14	·08	·08	·14	·15	..	·14
9	..	..	..	..	..	·01	·01	·02	..	..	·03	..	..	·01	..	..	·01	·01	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	·01	·01	..	·01	..	..	..	·01	..	..	..	..	..	..	..	·01	..	..	..	..
11	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..
12	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	..	..	·02	·02	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	·02	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	·01	·01	..	..	·02	..	·01	·01	..	·02	..	..	..	..	..	·01	..	..	..	..
18	..	..	..	..	..	·01	..	·02	..	..	..	..	..	..	..	..	·02	·01	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	·07	..	..	..	·01	..	·02	..	·02	..	·03	..	..	·01	..	..	..	..	..	..	..	·03	·04	..	..
21	·16	·29	·12	·03	·13	·02	..	·06	..	·03	·03	·04	·02	·02	·02	·03	·04	·06	·07	·11	·07	·02	·08	·06	·25	·04
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	·24	·22	·22	·09	·16	·12	·20	·16	·14	·14	·15	·17	·15	·19	·17	·20	·16	·19	·18	·19	·18	·22	·24	·23	·21	·23
26	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	·01	..	·01	·01	..	..	..	..	..	..	..	..
27	..	..	·01	..	..	·04	·07	·06	·02	·01	·07	·01	·03	·04	·03	·04	·06	·05	·03	·02	·07	·08	·01	..	..	·03
28	·02	·02	·03	·02	·02	·01	·01	·03	..	·03	·02	..	..	·04	·02	·03	·02	..	..	..	·02	·03	·01	·01	..	·02
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	·08	·09	·10	·08	·10	·02	·10	·10	·09	·08	·11	·08	·11	·13	·10	·11	·10	·10	·10	·12	·12	·08	·11	·07	·11	·09
31	·01	·02	..	..	..	..	..	·01	..	..	·01	..	..	..	..	·01	·01	..	..	..	·01	·01	·01	·02	·02	·01
*	·72	·91	·75	·36	·56	·32	·61	·71	·30	·43	·54	·44	·42	·59	·41	·49	·49	·51	·46	·59	·55	·55	·70	·61	·59	·58
†	5·42	5·72	5·98	4·37	5·22	4·64	4·98	5·48	4·02	5·40	5·26	5·27	6·16	5·56	5·01	5·29	4·55	5·16	4·70	5·30	4·94	5·02	5·64	4·70	4·66	4·77

March, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..
2	..	..	..	..	..
3	..	..	..	..	..
4	·04	·01	..	..	..
5	..	..	..	..	..
6	..	..	..	..	..
7	..	..	..	..	..
8	·07	·08	·04	·05	·03
9	·01	..	..	..	..
10	..	..	..	..	..
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	..	..	..	..	..
19	..	..	..	..	..
20	..	..	..	..	..
21	·04	·02	..	·03	..
22	..	..	..	..	..
23	·01	..	..	..	..
24	·01	..	..	..	..
25	·24	·19	·11	·20	·15
26	..	..	..	..	..
27	·03	·02	·05	·05	·04
28	·02	·02	·01	..	·04
29	..	..	..	..	..
30	·13	·10	·10	·08	·06
31	·01	·01	..	·02	..
*	·61	·45	·31	·43	·32
†	5·06	4·49	3·75	5·05	3·96

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(March, 1899.)

The month has been remarkably dry, sunny, and somewhat cold. It is the driest March since 1893 at most places in the district, though in some, as, for instance, at Redhill, where the record commences in 1867, it is the driest March in the period. The week ending the 25th was extremely cold, and snow showers were prevalent in some parts of the district on most of the days, the snow on the 21st being about one and a half inches deep. Radiation throughout the month has been great, the days being hot, and the nights cold, with the result that vegetation is generally somewhat backward. The month has been very unhealthy, influenza being extremely prevalent; whilst at Wallington there have been several cases of scarlet fever and one of diphtheria. Solar halos were seen at Croydon on the 6th and 26th, and a lunar one there on the 26th; whilst a lunar one was seen at Nutfield on the 1st, and thunder heard there on the 21st. The almond bloomed at Wallington on the 2nd, and at Sidcup on the 4th; the white and purple crocus at Wallington on the 12th, and the plum at Sidcup on the 29th. At Croydon the maximum thermometer was 50° and above on twelve days, and below 40° on seven days; whilst the minimum was 40° and above on four days, 20° and under 30° on fifteen days, and under 20° on three days. The mean temperature is about one degree below the average, and was at Chipstead 41·4°, at Croydon (Whitgift) 41°, at Wallington 40·7°, at Croydon (Duppas House) 40·5°, at Waddon 39·8°, and at Redhill 39·4°. There were recorded at Wallington 140·9 hours of sunlight, which is 6 per cent. above the March mean of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc., *Hon. Sec.*

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	Reigate Hill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jns. H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·01	..	·02	·01	·02	·02	·01	·02	·02	·01	·01	·01	..	·01	..	·01	..	MONTHLY GAUGE.	MONTHLY GAUGE.	·01	·02	..	·02	·04	MONTHLY GAUGE.	·01
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	·01	·01	..	..	·01	..	..	..	·01	..	·02	..	..			..	..	..	..	..		..
4	·08	·08	·10	·07	·07	·07	·05	·07	·08	·09	·08	·09	·10	·10	·11	·07	..			·04	..	·04	·08	·06		·06
5	..	..	·02	..	·01	·01	..	..	..	·01	..	·02	·01	·01	·03	·03	·06			·03	·06	..	·02	·03		·01
6	·22	·20	·15	·15	·12	·16	·15	·15	·13	·20	·15	·20	·17	·20	·22	·13	·17			·16	·04	·12	·16	·10		·15
7	·12	·22	·31	·28	·33	·33	·16	·28	·29	·26	·20	·23	·21	·20	·04	·21	·04			·21	·21	·13	·12	..		·21
8	·05	·05	·05	·02	·04	·04	·05	·05	·03	·05	..	·01	·01	·04	·08	·04	·20			·05	·06	·04	·04	·06		·08
9	·18	·19	·20	·26	·31	·31	·16	·25	·27	·26	·27	·26	·20	·24	·27	·24	·35			·24	·20	·20	·21	·14		·15
10	·06	·07	·07	·11	·07	·07	·04	·14	·11	·10	·06	·09	·09	·07	·17	·12	·08			·11	·11	·11	·11	·11		·09
11	·03	·03	·03	..	..	..	·01	..	..	..	..	·01	..	·02	·07	·01	..			·02	·03	·02	·02	·04		..
12	·27	·23	·28	·14	·19	·22	·20	·22	·16	·22	·16	·22	·23	·04	·16	·18	..			·15	·26	·19	·21	·18		·29
13	·30	·22	·22	·43	·40	·42	·23	·37	·37	·41	·49	·47	·48	·35	·44	·68	·62			·46	·51	·52	·47	·40		·25
14	·16	·14	·10	·16	·14	·17	·11	·14	·15	·13	·13	·12	·12	·10	·13	·17	·24			·19	·03	·10	·09	·08		·10
15	..	..	..	·03	..	..	..	..	..	·01	..	..	·01	..	·06	·04	..			·03	..	..	·01	·03		..
16	·07	·03	·04	..	·04	·04	..	·02	·14	·24	·21	·20	·15	·20	·28	·16	..			·16	·16	·22	·21	·10		·03
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·03			..	..	..	..	..		..
20	·29	·31	·25	·14	·20	·21	·24	·22	·10	·21	·20	·17	·18	·38	·17	·15	·06			·24	·32	·19	·20	·20		·21
21	·40	·40	·29	·42	·35	·35	·37	·35	·35	·30	·40	·35	·33	·22	·43	·33	·20			·27	·26	·38	·36	·41		·37
22	..	..	..	..	..	..	·01	·01	..	..	..	..	..	·03	..	..	·07			..	..	..	·01	..		..
23	..	·01	..	..	..	..	..	..	·01	·01	·01	..	·01	..	·02	·01	..			..	·07	·02	·02	·02		..
24	·42	·45	·40	·40	·45	·44	·44	·46	·36	·49	·44	·46	·47	·44	·45	·45	·10			·38	·43	·40	·38	·35		·48
25	·14	·14	·17	·19	·14	·14	·13	·15	·20	·17	·18	·16	·16	·16	·25	·17	·09			·20	..	·15	·16	·14		·12
26	·01	·01	..	..	..	..	·01	·05	..	..	·01	·04	..	..	·02	..	..			·01	..	·02	·01	·03		..
27	·03	·04	·03	·03	·03	·03	..	..	·04	·04	·03	..	·03	·02	·04	·03	..			·01	..	·01	·01	..		..
28	·03	·03	·03	·03	·03	·03	·01	..	·01	·02	·02	·02	·03	·02	·03	·02	..			·02	..	·02	·03	..		..
29	·07	·08	·06	·04	·05	·05	·10	·06	·04	·08	·08	·10	·16	·12	·11	·09	·11			·08	·14	·13	·05	..		·21
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
*	2·94	2·92	2·82	2·91	3·00	3·12	2·48	3·01	2·87	3·31	3·13	3·23	3·16	2·97	3·60	3·35	2·42	3·12	2·20	3·07	2·91	3·01	3·00	2·52	2·89	2·82
†	9·94	10·53	10 24	9·54	8·97	9·85	9·28	9·21	9 64	10·57	9·88	10·82	10·30	10·45	11·73	10·43	8·63	10·63	6·84	9·25	10·15	9·09	9·85	9·46	9·92	9·43

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump.St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·02	·02	·01	·02	·03	·02	·02	·01	·01	·02	·02	·02	·02	·01	·03	·05	·01	·01	·02	·02	·01	·01	·01	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	·01	..	..	..	..	·01	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	·01	..	·01	..	·01	..	..	..	..	·02	..	·01	·01	..	..	..	..
4	·07	·05	·09	·08	·07	·06	·07	·06	·07	·07	·06	·07	·07	·06	·06	·06	·06	·05	..	·03	·03	..	·01	·03	·05	·06
5	·01	..	·01	..	·01	·01	·01	·01	·01	·01	·01	·01	..	·01	·01	·01	·02	..	·05	·01	·01	..	·01	..	·02	·01
6	·10	·07	·13	·08	·07	·08	·09	·06	·09	·09	·09	·09	·08	·11	·12	·14	·17	·15	·17	·14	·13	·13	·08	·09	·07	·07
7	·09	·20	·17	·10	·09	·12	·12	·12	·16	·14	·20	·20	·17	·18	·18	·19	·22	·18	·08	·11	·11	·10	·16	·10	·13	·12
8	·03	·04	·02	·02	·05	·04	·04	·03	·05	·05	·06	·07	·04	·05	·04	·02	·04	·01	·05	·02	·02	·08	·08	·02	·08	·08
9	·17	·16	·21	·09	·21	·23	·23	·21	·22	·23	·23	·24	·23	·23	·21	·23	·22	·25	·23	·18	·22	·22	·22	·21	·24	·27
10	·08	·06	·07	·01	·12	·12	·12	·14	·13	·14	·15	·15	·14	·15	·12	·15	·14	·15	·14	·14	·12	·10	·12	·24	·10	·08
11	·02	..	..	·02	·02	·03	·03	·03	·03	·03	·03	·03	·02	·03	·03	·03	·02	·01	·02	..	·01	..	·02	..	·01	..
12	·18	·15	·27	·20	·18	·16	·14	·06	·13	·16	·15	·10	·13	·17	·14	·11	·18	·13	·16	·10	·13	·11	·10	·03	·07	·06
13	·30	·27	·43	·35	·36	·36	·34	·29	·40	·37	·38	·39	·35	·38	·45	·52	·52	·68	·57	·63	·65	·62	·64	·60	·52	·63
14	·07	·03	·08	·05	·04	·04	·04	·03	·03	·04	·04	·06	·03	·04	·06	·12	·09	·07	·07	·10	·10	·13	·11	·07	·09	·11
15	..	·02	·01	·02	·01	..	..	..	..	·01	..	·01	·01	..	·02	·03	·01	·01	·03	·01	·01	·01	·03	·01	·01	..
16	·03	..	·03	·05	·07	·06	·03	·04	·03	·03	·04	·04	·03	·03	·03	·06	·08	·05	·10	·07	·09	·13	·12	·10	·17	·15
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	·01	..	·01	..	·01	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	·22	·23	·21	·20	·18	·20	·20	·14	·18	·18	·20	·20	·18	·16	·17	·10	·17	·16	·17	·18	·15	·22	·13	·18	·18	·15
21	·37	·40	·41	·29	·30	·29	·28	·19	·27	·29	·25	·28	·28	·31	·32	·39	·36	·33	·30	·35	·34	·24	·30	·19	·27	·29
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	·01	·01	·01	·02	..	·01	·01	·01	·01	·01	·02	·02	·02	·01	·01	·03	·02	..	·02	·01	·01	·01	·02	·01	·02	·02
24	·45	·45	·39	·39	·37	·37	·36	·30	·38	·35	·39	·39	·42	·35	·29	·24	·31	·30	·27	·22	·24	·21	·25	·32	·34	·45
25	·12	·15	·13	·15	·15	·16	·15	·14	·18	·17	·18	·23	·15	·18	·14	·23	·19	·21	·20	·22	·22	·24	·30	·36	·21	·20
26	..	..	..	·02	..	·01	·01	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..	..	·01	..	..	..
27	..	..	·01	..	..	..	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	..	·01	..	·02	·02
28	..	..	·01	·01	..	..	·01	..	..	..	..	..	..	..	..	..	·01	..	..	..	·01	·01	..	..	..	..
29	·05	·04	·06	·02	..	·01	·01	..	·02	·01	·03	·03	·03	·02	·02	·03	·02	·01	·02	·01	·01	·02	·04	·10	·06	·08
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*	2·39	2·35	2·76	2·19	2·33	2·38	2·31	1·87	2·40	2·43	2·53	2·66	2·40	2·50	2·46	2·75	2·87	2·76	2·70	2·55	2·65	2·60	2·77	2·66	2·66	2·85
†	8·03	7·70	9·94	8·01	8·16	8·46	8·14	6·98	8·20	8·45	8·42	8·72	7·98	8·76	8·87	9·75	10·01	9·58	9·22	7·99	8·68	8·74	8·65	7·06	7·87	8·84

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartmrd.)	Forest Hill (S&VWC	Sideup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	·01	..	..	..	·02	·02	·02	·01	·01	..	..	..	·03	·01	·02	·01	·02	·02	·01	·02	·01	..	·02	..	..
2	..	..	..	..	..	..	·01	·01	·01	·01	..	·02	..	..	·02	..	·01	·01	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..
4	·06	·05	·06	·07	..	·06	·06	·07	·04	·04	·05	·05	·05	·07	·05	·06	·07	·08	·07	·06	·07	·07	·05	..	..	·04
5	..	·02	·02	·02	..	..	..	·01	..	..	..	..	..	·02	·01	·01	·02	·02	·01	·02	·02	·02	·02	·02	..	·02
6	·10	·08	·09	·02	·07	·07	·09	·10	·07	·08	·10	·10	·10	·10	·10	·10	·08	·09	·09	·10	·08	·08	·09	·05	·08	·08
7	·13	·10	·12	·14	·15	·10	·11	·11	·08	·09	·07	·11	·11	·14	·14	·08	·07	·13	·12	·11	·12	·12	·14	·11	·15	·18
8	·05	·03	·03	..	·03	·05	·04	·06	·02	·03	·03	·08	·02	·06	·07	·03	·01	·02	·03	·04	·16	·06	·11	·02	..	·12
9	·26	·22	·27	·27	..	·25	·27	·26	·17	·16	·16	·17	·13	·29	·29	·30	·25	·28	·26	·28	·22	·30	·24	·21	·26	·26
10	·07	·09	·09	·12	·15	·15	·14	·14	·02	·05	·09	·11	·17	·19	·14	·12	·09	·10	·10	·09	·12	·14	·16	·25	·31	·19
11	..	·02	·01	·02	..	·02	·01	·03	..	..	..	..	..	·02	·02	·01	·01	·02	·01	·01	..	·01	·02	·03	·02	·02
12	·04	·08	·09	·08	·19	·20	·08	·09	·06	·10	·07	·11	·09	·06	·05	·07	·09	·08	·03	·08	·08	·05	·12	·05	·34	·04
13	·71	·76	·54	·44	·30	·31	·28	·29	·25	·24	·30	·29	·29	·28	·24	·36	·33	·35	·36	·41	·35	·33	·46	·58	·75	·48
14	·09	·14	·08	·06	..	·07	..	·08	·06	·08	·11	·07	·09	·13	·15	·17	·10	·11	·12	·12	·15	·16	·13	·13	·15	·17
15	·01	·02	·01	·01	·04	·03	·10	·03	·03	·06	·03	·10	·03	·01	·03	·03	·03	·03	·02	·01	·02	·02	·02	..	..	..
16	·11	·09	·07	·02	..	·05	·04	·04	·03	·01	·04	·02	·04	·12	·04	·04	·03	·04	·03	·05	·05	·03	·09	·10	·08	·05
17	..	..	..	..	·03	·03	..	..	..	..	..	..	..	..	·01	..	..	..	..	·01	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	·03	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	·17	·16	·17	·13	·18	·16	·15	·17	·17	·18	·20	·18	·25	·20	·19	·13	·19	·17	·15	·14	·11	·15	·16	·14	..	·14
21	·27	·30	·30	·28	·28	·24	·27	·28	·21	·30	·24	·28	·24	·27	·23	·30	·27	·34	·32	·29	·32	·27	·26	·19	·37	·26
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	·02	·03	·02	·01	..	·02	·02	·03	·01	·02	·02	·02	·03	·03	·03	·04	·03	·02	·01	·03	·04	·03	·03	·01	·14	·02
24	·44	·28	·49	·40	·46	·38	·43	·51	·43	·40	·33	·47	·45	·35	·35	·39	·47	·55	·56	·58	·52	·50	·50	·35	·51	·46
25	·17	·20	·18	·16	·12	·12	·14	·13	·10	·14	·13	·13	·13	·19	·16	·18	·15	·13	·12	·14	·16	·17	·24	·27	·25	·24
26	..	..	·01	..	..	..	·01	·02	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
27	·01	..	..	·01	·01	..	·01	·02	·01	·01	·02	·01	·01	·04	·03	·02	·03	·02	·01	·02	..	·03	·02	·03	..	·02
28	..	·02	·01	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..
29	·06	·04	·09	·02	·04	·10	·09	·10	·10	·12	·12	·12	·10	·08	·03	..	·14	·09	·11	·14	·13	·12	·10	·05	·14	·11
30	..	..	..	..	..	·03	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*	2·77	2·74	2·75	2·28	2·05	2·49	2·37	2·60	1·88	2·13	2·11	2·44	2·35	2·68	2·39	2·46	2·49	2·70	2·55	2·74	2·74	2·67	2·96	2·61	3·55	2·90
†	8·19	8·46	8·73	6·65	7·27	7·13	7·35	8·08	5·90	7·53	7·37	7·71	8·51	8·24	7·40	7·75	7·04	7·86	7·25	8·04	7·68	7·69	8·60	7·31	8·21	7·67

* The figures in this row give the totals for the month. † The totals from January 1st.

April, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·01	·01	·01	..	·04
2	·01	..	..	..	..
3	..	..	..	..	..
4	·06	·03	·03	·07	·03
5	·02	·01	..	·01	·04
6	·10	·07	·07	·10	·08
7	·18	·16	·11	·11	·08
8	·13	·22	·06	·02	·06
9	·31	·27	·22	·27	·20
10	·22	·19	·19	·20	·23
11	·01	..	..	..	..
12	·03	·02	·06	·03	·04
13	·47	·40	·29	·38	·27
14	·21	·22	·18	·18	·13
15	·01	..	..	·02	·02
16	·05	·03	·03	·03	·04
17	..	..	..	..	..
18	..	..	..	..	..
19	..	..	..	..	..
20	·17	·13	·14	·08	·14
21	·21	·20	·27	·36	·16
22	..	..	..	..	..
23	·05	·03	·02	·03	·03
24	·45	·38	·41	·30	·27
25	·24	·20	·14	·20	·15
26	..	..	..	..	..
27	·02	..	·01	·03	..
28	..	..	..	..	..
29	·04	·03	·04	·05	·06
30	..	..	..	..	..
*	5·00	2·60	2·28	2·47	2·07
†	8·06	7·09	6·03	7·52	6·03

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(April, 1899.)

The month has been cool and very wet. It is certainly the wettest April in most places since 1882, and in some since 1877, an exceptionally wet April. The nights as a rule have been warm—in fact, so far as the Wallington record is concerned, they are the warmest with the exception of April, 1894,—whilst the days have been cold. The result is that vegetation, though looking well, is very backward, and there has been much sickness about, though not so much as in the previous month. Snow, with hail and thunder, occurred in most places in the district on the 8th, and on the 27th lightning was seen at Sevenoaks in the south-west. At Sidcup the cherry flowered on the 9th, the pear on the 15th, and the apple on the 30th. At Nutfield the wryneck was heard on the 5th, the cuckoo there and also at Abinger on the 15th, and at Croydon on the 16th; the nightingale was heard at Abinger on the 20th; whilst the swallow was seen at Nutfield on the 20th, at Beddington on the 22nd, and at Abinger on the 23rd. At Croydon the maximum in the shade was 60° and above on four days, between 50° and 59° on fifteen days, and between 40° and 49° on eleven days; whilst the minimum in the shade was between 40° and 45° on thirteen days, between 30° and 39° on thirteen days, and below 30° on four days. Solar halos were seen at Croydon on the 5th and 23rd, and at Wallington on the 12th, 20th, and 23rd. The mean temperature of the month was about ¾° above the average, and was at Croydon (Duppas House) 48·1°, at Wallington 47·8°, at Croydon (Whitgift) 47·6°, at Waddon 47·2°, at Chipstead 47·1°, and at Redhill 46·5°. There were recorded at Wallington 137·1 hours of sunlight, which is 8 per cent. below the April mean of the ten years 1886–95.

F. Campbell-Bayard, F.R.Met.Soc., *Hon. Sec.*

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for May is 2·00 in.* **May, 1899.**

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	Reigate Hill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jas.H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	..	..	..	..	..	MONTHLY GAUGE.	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
8	·02	·02	·02	·01	·02	·02	·01	·02	·01	·01	·02	·02	·01	..	·04	·02	..			·05	..	·02	..	..		·12
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	·01	·01	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..			..	·04	·01	·03	·03		·03
14	·40	·43	·46	·35	·39	·38	·36	·38	·35	·39	·38	·39	·48	·45	·43	·34	·34			·43	·36	·40	·40	·39		·41
15	·24	·13	·22	·23	·22	·22	·20	·20	·19	·16	·20	·21	·24	·28	·26	·19	·14			·11	·27	·18	·20	·18		·12
16	·13	·20	·25	·06	·09	·09	·09	·14	·11	·18	·08	·16	·31	·08	·14	·13	·13			·05	·22	·33	·49	·46		·31
17	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..			..	..	..	..	·02		..
18	·01	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	·19	·10	·19	·16	·16	·17	·16	·15	·14	·16	·15	·14	·18	·15	·16	·21	·14			·12	·18	·12	·13	·10		·15
20	·02	·07	·05	·05	·03	·02	..	·04	·07	·06	·08	·08	·09	·11	·10	·07	·24			·03	·06	·05	·05	·06		·14
21	·15	·02	·20	·22	·23	·24	·24	·26	·26	·15	·21	·24	·19	·20	·22	·20	..			·18	·24	·16	·16	·10		·25
22	·01	..	·08	·01	·01	·01	..	·02	·02	·05	·03	·02	·02	..	·03	·03	..			·04	·01	·03	·04	·03		·04
23	..	·04	·04	..	..	..	·01	·02	·01	·03	..	·01	·06	·04	..	..	..			·05	..	·04	·06	·06		·01
24	·13	·12	·17	·14	·25	·24	·16	·20	·14	·19	·23	·17	·20	·21	·26	..	..			·10	·37	·24	·29	·28		·15
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
*	1·31	1·14	1·68	1·23	1·40	1·39	1·24	1·43	1·31	1·38	1·38	1·44	1·79	1·52	1·64	1·19	·99	1·45	1·18	1·16	1·75	1·58	1·85	1·71	1·62	1·73
†	11·25	11·67	11·92	10·77	10·37	11·24	10·52	10·64	10·95	11·95	11·26	12·26	12·09	11·97	13·37	11·62	9·62	12·08	8·02	10·41	11·90	10·67	11·70	11·17	11·54	11·16

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Beddington	Waddon	Croydon (Brim. Bn.)	Croydon (Wn. N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml. rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W Wickham (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farnborough	Orpington	Farningham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	·01	·01	·02	..	..	..	..	..	·01	·01	·01	..	·01	·01	·03	·02	·01	·02	·02	·01	·01	·03	..	·01	·02
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	·03	·02	·06	·04	·04	·04	·02	·03	·02	·02	·01	·01	·02	·01	·04	·05	·05	..	·01	..	..	·01	..	..
14	·47	·42	·40	·39	·38	·38	·39	·38	·40	·38	·39	·37	·39	·38	·37	·35	·36	·40	·34	·35	·35	·35	·40	·38	·35	·36
15	·15	·12	·18	·11	·12	·11	·12	·10	·13	·14	·15	·12	·07	·19	·25	·36	·19	·25	·24	·22	·18	·18	·10	·09	·21	·12
16	·32	·28	·32	·26	·29	·32	·33	·22	·32	·32	·32	·27	·23	·32	·35	·38	·43	·37	·31	·35	·34	·30	·29	·28	·23	·29
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	·15	·15	·11	·09	·08	·08	·08	·05	·08	·10	·08	·09	·07	·08	·10	·11	·13	·05	·11	·09	·08	·10	·11	..	·07	·07
20	·02	·02	·06	·03	·03	·03	·03	·04	·04	·03	·05	·05	·04	·04	·02	·05	·05	·08	..	·04	·04	·05	·04	..	·05	..
21	·23	·22	·18	·16	·18	·16	·15	·10	·15	·15	·12	·14	·11	·14	·14	·15	·16	·15	·11	·15	·16	·13	·08	·10	·09	·14
22	·02	·02	·03	·04	·04	·03	·03	·03	·03	·03	·09	·04	·03	·04	·03	·05	·03	·03	·04	·02	·03	·02	·02	..	·03	·03
23	·20	·17	·02	·20	·23	·25	·26	·22	·33	·32	·28	·26	·21	·26	·09	·13	·13	·07	·11	·02	·01	..	·01	·18	·27	·20
24	·13	·12	·20	·20	·30	·29	·22	·30	·22	·19	·22	·26	·20	·20	·28	·39	·31	·45	·39	·25	·26	·32	·14	·12	·35	·36
25	..	..	..	·01	..	..	..	..	..	·02	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*	1·69	1·53	1·54	1·53	1·71	1·69	1·65	1·48	1·72	1·72	1·73	1·65	1·36	1·67	1·68	2·02	1·86	1·91	1·72	1·51	1·47	1·46	1·22	1·16	1·66	1·59
†	9·72	9·23	11·48	9·54	9·87	10·15	9·79	8·46	9·92	10·17	10·15	10·37	9·34	10·43	10·55	11·77	11·87	11·49	10·94	9·50	10·15	10·20	9·87	8·22	9·53	10·43

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm.rd.)	Forest Hill (S&VWC	Sideup	Wilmington	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
2	..	..	..	..	..	..	·01	..	..	..	..	..	..	·03	..	..	..	..	..		..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
8	..	·02	·01	..	..	..	·01	·02	..	·01	..	·01	·01	·01	·01	..	·01	..	..		..	·01	·02	..	..	·01
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
10	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	·01	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
13	..	..	..	..	..	·01	·01	·01	·01	·01	·01	·01	·02	·02	·01	..	..	..	..		..	..	..	..	..	..
14	·35	·34	·46	·35	·36	·33	·40	·40	·35	·41	·39	·44	·49	·45	·39	·38	·36	·38	·36		·38	·38	·37	·37	·40	·37
15	·15	·20	·20	·08	·05	·11	·13	·10	·11	·10	·09	·17	·10	·04	·11	·10	·07	·11	·08		·06	·07	·13	·17	·15	·10
16	·29	·27	·25	·21	·24	·24	·26	·31	·21	·21	·30	·25	·30	·38	·27	·23	·26	·40	·34		·34	·38	·23	·22	·34	·33
17	..	..	·01	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..		·02	..	·01	..	..	..
19	·07	·09	·06	·05	·08	·09	·10	·11	·08	·15	·14	·15	·16	·11	·10	·08	·09	·09	·07		·09	·08	·07	·04	..	·04
20	·06	·05	·08	·07	·11	·11	·13	·16	·19	·12	·12	·21	·15	·10	·11	·17	·12	·19	·17		·19	·16	·16	·09	..	·15
21	·09	·11	·10	·10	·10	·05	·09	·09	·10	·14	·10	·09	·09	·10	·06	·07	·06	·06	·06		·03	·06	·09	·05	·19	·07
22	·03	·03	·03	·03	·03	..	·04	·04	·02	·04	·04	·03	·03	·03	·02	·02	·03	·03	·03		·04	·03	·02	·01	..	·02
23	·20	·24	·24	·21	·11	..	..	·01	·02	·05	·04	·03	·04	·03	·01	·01	·02	·09	·04		·06	·05	·15	·23	·09	·07
24	·33	·33	·43	·20	·22	·20	·35	·37	·08	·14	·14	·07	·04	·22	·14	·21	·25	·31	·23		·28	·27	·20	·10	·21	·30
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
*	1·57	1·68	1·87	1·30	1·30	1·14	1·54	1·63	1·17	1·39	1·37	1·46	1·43	1·52	1·23	1·27	1·27	1·66	1·38		1·49	1·50	1·45	1·28	1·38	1·46
†	9·76	10·14	10·60	7·95	8·57	8·27	8·89	9·71	7·07	8·92	8·74	9·17	9·94	9·76	8·63	9·02	8·31	9·52	8·63		9·17	9·19	10·05	8·59	9·59	9·13

OBSERVER DEAD. RECORD CEASED.

* The figures in this row give the totals for the month. † The totals from January 1st.

May, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..
2	..	..	..	..	..
3	..	..	..	..	..
4	..	..	..	..	..
5	..	..	..	..	..
6	..	..	..	..	..
7	..	..	..	..	..
8	·01	..	·02	·01	·01
9	..	..	..	..	..
10	..	..	..	..	..
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	·38	·31	·35	·34	·37
15	·05	·04	·03	·09	·05
16	·28	·24	·20	·22	·20
17	..	..	..	..	..
18	..	..	..	..	..
19	·09	·05	·05	·07	·05
20	·18	·16	·15	·16	·04
21	·07	·05	·06	·06	·10
22	·02	·02	·02	·01	..
23	·02	·03	·05	·01	·03
24	·55	·31	·21	·30	·10
25	..	..	..	..	..
26	..	..	..	..	..
27	..	..	..	..	..
28	..	..	..	..	..
29	..	..	..	..	..
30	..	..	..	..	..
31	..	..	..	..	..
*	1·65	1·21	1·14	1·27	·95
†	9·71	8·30	7·17	8·79	6·98

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(May, 1899.)

The month may be divided into three portions, *viz.* from 1st to 12th very dry and cold, from 13th to 24th wet and warm, and from 25th to 30th dry and cold. All vegetation is extremely late, the cold period at the end of the month doing great damage, especially to the early potatoes, beans, and strawberries. The hawthorn flowered at Croydon on the 11th, and was with the horse-chestnut and laburnum still in flower at the end of the month. There has been a great deal of sickness throughout the district, mainly influenza, with colds and sore throats. Mushrooms were found in the open at Warlingham on the 12th. A hailstorm occurred at Addington Hills about half an hour after noon on the 15th, and at Sidcup on the 23rd, and thunder was heard at Sidcup on the 16th, and a rainbow was seen on the same day at Addington Hills. At Croydon on the 21st there was a heavy black mist at noon. The rainfall throughout the district is between a quarter and half an inch below the average. At Croydon the maximum was 70° on one day, between 60° and 69° on twelve days, and between 50° and 59° on eighteen days; whilst the minimum was between 40° and 49° on eighteen days, 30° and 39° on eleven days, and below 30° on two days. The mean temperature of the month is below the average, as much as 2° at Redhill and Wallington, and was at Croydon (Duppas House) 51·8°, at Chipstead 51·2°, at Croydon (Whitgift) 51·1°, at Waddon and Wallington 51°, and at Redhill 50·4°. There were recorded at Wallington 205·5 hours of sunlight, which is the May average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc., *Hon. Sec.*

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jas.H.)	Warling-ham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leather-head
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	..	..	..	..	..	MONTHLY GAUGE.	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	·11	·11	·11	·04	·05	·06	·01	·05	·04	·06	·05	·06	·06	·05	·08	·11	·30			·12	·09	·07	·08	·06		·06
19	·54	·49	·60	·27	·22	·24	·31	·33	·27	·32	·22	·25	·31	·24	·29	·36	·37			·33	·40	·20	·25	·22		·47
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	·01	..		..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
22	·12	·12	·10	·10	·15	·15	..	·10	·09	·11	·10	·11	·16	·14	·15	·15	·13			·14	·20	·18	·20	·14		·06
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	·03		..
25	·02	·02	·02	·04	·04	·04	·03	·06	·06	·05	..	·04	·06	·07	..	..	..			..	·01	·03	·02	·02		·05
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
28	·05	·01	·10	·05	·25	·34	·09	·04	·04	·02	·16	·03	·02	·05	·11	..	..			·25	·07	..	·03	..		·16
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·10	·24			..	..	..	..	..		..
30	·52	·65	·50	·39	·51	·52	·45	·45	·43	·59	·38	·62	·56	·64	·58	·47	·36			·54	·68	·57	·57	·43		.42
*	1·36	1·40	1·43	·89	1·22	1·35	·89	1·03	·93	1·15	·91	1·11	1·17	1·19	1·21	1·19	1·40	1·24	1·04	1·38	1·45	1·05	1·16	·90	1·13	1·22
†	12·61	13·07	13·35	11·66	11·59	12·59	11·41	11·67	11·88	13·10	12·17	13·37	13·26	13·16	14·58	12·81	11·02	13·32	9·06	11·79	13·35	11·72	12·86	12·07	12·67	12·38

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump.St.)	W.Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18	·06	·06	·06	·05	·05	·04	·05	·05	·05	·07	·05	·05	·05	·05	·06	·07	·07	·06	·07	·06	·07	·07	·12	·09	·04	·06
19	·41	·40	·36	·23	·18	·14	·20	·18	·22	·23	·24	·25	·22	·26	·29	·33	·33	·32	·35	·35	·34	·27	·33	·15	·24	·31
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	·06	·05	·12	·11	·12	·13	·13	·12	·13	·14	·14	·13	·12	·16	·18	·20	·17	·17	·19	·16	·18	·18	·28	·35	·21	·19
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	·09	·08	·06	·03	·01	..	·01	..	·01	·01	·01	·02	·02	·02	·02	·02	·02	..	..	·05	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	·21	·15	·01	..	..	·01	..	..	..	·01	..	·01	..	·01	·01	·01	·02	..	·02	·04	·04	·06	·05	·04	·02	·01
29	..	..	..	·02	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	·37	·32	·41	·38	·41	·40	·41	·38	·44	·40	·43	·39	·38	·42	·46	·45	·54	·53	·43	·50	·51	·44	·61	·49	·34	·52
*	1·20	1·06	1·02	·82	·77	·72	·81	·73	·85	·86	·87	·85	·79	·92	1·02	1·08	1·15	1·08	1·06	1·16	1·14	1·03	1·39	1·12	·85	1·09
†	10·92	10·29	12·50	10·36	10·64	10·87	10·60	9·19	10·77	11·03	11·02	11·22	10·13	11·35	11·57	12·85	13·02	12·57	12·00	10·66	11·29	11·23	11·26	9·34	10·38	11·52

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm. rd.)	Forest Hill (S&VWC	Sidcup	Wilmington	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	RECORD CEASED.	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
18	·06	·05	·07	·05	·04	·07	·07	·06	·06	·11	·10	·07	·09	·08	·06	·06	·06	·06	·07		·11	·08	·08	·09	·10	·07
19	·30	·34	·30	·22	·21	·18	·25	·27	·20	·33	·30	·25	·25	·27	·26	·18	·17	·23	·21		·22	·20	·31	·22	·23	·25
20	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	·01	·02	..	..		..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
22	·21	·17	·20	·12	·13	·14	·11	·10	·08	·08	·10	·08	·09	·15	·15	·17	·16	·17	·16		·17	·16	·17	·30	·25	·21
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
25	..	..	·02	·01	..	..	·02	·02	·08	·06	·06	·07	·09	·04	..	..	·02	·01	·03		·01	·01	..	..	..	·01
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
28	..	·03	·01	..	..	·08	·20	·14	·18	·90	·60	·32	·28	·58	·23	·08	..	..	..		..	..	·03	·01	..	..
29	..	..	..	..	..	..	..	·01	..	·01	·01	·02	..	..	..	..	..	..	..		..	..	..	..	..	..
30	·54	·35	·57	·38	·36	·40	·36	·55	·26	·27	·28	·34	·30	·40	·36	·33	·56	·47	·62		·56	·53	·48	·40	·42	·52
*	1·11	·94	1·17	·78	·74	·88	1·01	1·16	·86	1·76	1·45	1·15	1·10	1·52	1·06	·83	·99	·94	1·09		1·07	·98	1·07	1·02	1·00	1·06
†	10·87	11·08	11·77	8·73	9·31	9·15	9·90	10·87	7·93	10·68	10·19	10·32	11·04	11·28	9·69	9·85	9·30	10·46	9·72		10·24	10·17	11·12	9·61	10·59	10·19

OBSERVER DEAD.

* The figures in this row give the totals for the month. † The totals from January 1st.

June, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..
2	..	..	..	..	..
3	..	..	..	..	..
4	..	..	..	..	..
5	..	..	..	..	..
6	..	..	..	..	..
7	..	..	..	..	..
8	..	..	..	..	..
9	..	..	..	..	..
10	..	..	..	..	..
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	·07	·05	·07	·06	·05
19	·25	·27	·21	·20	·16
20	..	..	..	..	..
21	..	..	..	..	..
22	·18	·14	·15	·17	·14
23	..	..	..	..	..
24	..	..	..	..	..
25	·01	..	·01	·03	·02
26	..	..	..	..	..
27	..	..	..	..	..
28	..	..	..	·02	·04
29	..	..	..	..	..
30	·69	·67	·67	·44	·40
*	1·20	1·13	1·11	·92	·81
†	10·91	9·43	8·28	9·71	7·79

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(June, 1899.)

The month has been remarkably dry and sunny, but the temperature has been somewhat variable. The absolute drought lasted from May 24th to June the 18th, a period of twenty-four days, and all growing crops, with the exception of wheat, suffered severely. The month has been a healthy one. Solar halos were seen at Greenwich on the 18th, 19th, 21st, and 30th, at Sidcup on the 19th, and at Wallington on the 19th and 21st; whilst a parhelion was seen at Greenwich on the 21st. A thunderstorm occurred on the 28th, but it was of no importance except in the Thames valley. At Croydon the maximum temperature was 70° and above on fifteen days, 60° and under 70° on thirteen days, and 50° and under 60° on two days; whilst the minimum temperature was 50° and above on eleven days, 40° and under 50° on seventeen days, and under 40° on two days. The mean temperature of the month is somewhat variable, but may be taken to be from 1° to 2·5° above the average, and was at Chipstead 61·7°, at Croydon (Duppas House) 61·6°, at Croydon (Whitgift) 61·2°, at Waddon 60·8°, and at Wallington 60·7°. The rainfall of the month is ¾ in. below the average. There were recorded at Wallington 256·3 hours of sunlight, which is ten per cent. above the June average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc.,
Hon. Sec.

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jus. H.)	Warling-ham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leather-head
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·16	·27	·20	·35	·29	·31	·25	·25	·20	·12	·18	·14	·29	·15	·18	·42	·39	MONTHLY GAUGE.	MONTHLY GAUGE.	·45	·20	·27	·23	·15	MONTHLY GAUGE.	·14
2	·09	·10	·06	·04	·06	·06	·02	·06	·05	·05	·07	·06	·07	·08	·08	·10	·18			·02	·16	·08	·13	·14		·05
3	..	..	..	·01	·01	·01	·01	..	·02	·02	·15	·03	·02	..	·05	..	..			..	·02	·02	·01	·10		..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..			..	..	..	..	..		..
6	..	..	..	..	..	..	..	..	..	..	..	..	..	·08	..	..	..			..	·01	..	..	..		..
7	·04	·02	..	..	..	..	..	..	..	..	·04	..	..	·04	·14	..	..			..	..	..	..	..		..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	·10	·09	·11	·05	·05	·05	·04	·06	·05	·04	..	·04	·07	·05	·04	..	..			..	·08	·05	·07	·05		·15
11	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..			..	..	..	·02	..		..
12	·01	..	..	·01	·01	..	·01	..	·01	·01	..	..	..	..	..	..	..			·05	..	..	..	..		..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
20	·18	·24	·41	..	..	..	..	..	..	..	..	..	..	..	..	..	..			·04	..	..	..	..		·31
21	·02	..	·02	·03	·03	·03	·01	·03	·02	·03	·03	·02	·02	·02	·04	·03	·04			·11	·04	·03	·03	..		·02
22	·07	·06	·05	·06	·05	·05	·01	·05	·07	·05	·11	·06	·04	·13	·11	·02	·06			·16	·23	·13	·24	·34		·10
23	·24	·13	1·42	·09	·05	·04	·06	·15	·32	1·13	·20	1·31	·48	1·14	1·32	·81	..			·54	·61	·13	·08	·08		·11
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	·02	..	..	..	·03	·03	..	·01	·03	·02	·03	·03	·04	..	·04	·03	..			..	·08	·04	·04	·02		·02
27	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..			..	..	..	..	..		..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	·02	..	..	..			..	..	..	..	..		..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
*	·93	·91	2·27	·64	·58	·58	·42	·61	·77	1·47	·81	1·70	1·03	1·72	2·00	1·41	·67	1·22	1·33	1·37	1·43	·75	·85	·88	·60	·90
†	13·54	13·98	15·62	12·30	12·17	13·17	11·83	12·28	12·65	14·57	12·98	15·07	14·29	14·88	16·58	14·22	11·69	14·54	10·39	13·16	14·78	12·47	13·71	12·95	13·27	13·28

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn)	Croydon (Wn. N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml. rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·08	..	·22	·12	·17	·15	·15	·12	·14	·15	·11	·14	·10	·15	·26	·27	·19	·20	·31	·16	·21	·22	·30	·29	·16	·15
2	·04	·04	·04	·06	·09	·13	·13	·14	·13	·14	·10	·08	·07	·08	·07	·07	·09	·09	·04	·05	·05	·05	·06	..	·08	·05
3	..	..	·01	·03	·02	·01	·01	·02	·01	·01	·02	·02	·01	·01	·02	·03	·02	·02	·02	·02	·01	..	·02	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
6	..	..	..	..	..	..	..	·02	·01	·03	·05	·08	·09	·01	·01	·05	..	..	..	..	..	..	..	..	·02	·09
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·69	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·02	..
10	·10	·07	·08	·11	·08	·08	·07	·06	·06	·06	·07	·08	·06	·08	·07	·07	·05	·04	·06	..	·01	·02	..	..	..	·04
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	·01	..	..	..	..	..	·03	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·03	·02	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	·12	·05	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·07	·08	·03	..	..	..
21	·01	·02	·02	·03	·03	·02	·03	·02	·03	·04	·03	·03	..	·02	·03	·02	·03	·02	·04	·04	·05	·05	·10	·10	·05	·05
22	·25	·16	·17	·10	·18	·17	·14	·16	·18	·17	·19	·18	·20	·18	·27	·52	·29	·21	·27	·22	·23	·29	·33	·77	·30	·33
23	·11	·09	·09	·04	·02	·02	·02	..	·02	·02	·02	·01	·02	·02	·02	·11	·16	·04	·08	·17	·16	·12	·12	·05	·07	·08
24	·02	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	·01	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	·02	..	..	·01	·01	..	·01	·02	·01	·02	·01	·03	·01	·01	·02	·01	·01	..	..	·02	·02	..	·02	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
*	·75	·43	·63	·52	·60	·58	·56	·56	·59	·64	·60	·66	·56	·56	·77	1·17	·86	·62	·82	·69	·82	·83	1·73	1·23	·70	·79
†	11·67	10·72	13·13	10·88	11·24	11·45	11·16	9·75	11·36	11·67	11·62	11·88	10·69	11·91	12·34	14·02	13·88	13·19	12·82	11·35	12·11	12·06	12·99	10·57	11·08	12·31

* The figures in this row give the totals for the month. † The totals from January 1st.

† The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandsw'th. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm. r'd.)	Forest Hill (S&VWC	Sideup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·20	·18	·11	·10	·07	·11	·07	·06	·02	·02	·04	·02	·04	·15	·10	·13	·12	·13	·10		·16	·14	·14	·27	·22	·27
2	·06	·04	·06	·04	·09	·12	·05	·07	·03	·02	·03	·04	·03	·06	·11	·06	·04	·04	·04		·05	·04	·03	·05	·05	·04
3	·01	·02	·01	·02	·02	·02	·02	·03	·01	..	..	..	·01	·03	·02	·02	·02	·02	·02		·01	·01	·01	·02	·03	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
5	·01	..	..	·03	·08	..	..	..	·05	..	·03	·02	·05	·02	..	..	..	..	..		..	..	..	..	..	..
6	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..		..	..	..	..	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
10	·06	·05	·08	·07	·08	·10	·13	·13	·10	·14	·14	·09	·11	·13	·10	·18	·11	·10	·06		·08	·05	·02	..	..	·05
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
12	..	..	·07	..	..	..	..	·01	..	·01	..	..	..	..	..	..	·01	..	..		..	..	..	·06	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
17	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	·07	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
20	..	..	..	..	..	·05	..	·19	·08	·01	..	·01	·02	..	·06	·05	·01	..	..		..	..	..	·02	·05	..
21	·03	·05	·04	·03	·03	·04	·17	·04	·03	·03	·03	·02	·04	·06	·04	·04	·04	·02	·06		·05	·04	·08	·08	·09	·06
22	·31	·26	·30	·16	·17	·12	·19	·12	·09	·22	·24	·12	·14	·12	·15	·15	·20	·29	·22		·31	·38	·57	·77	·83	1·08
23	·08	·08	·07	·02	·02	·02	·03	·04	·02	·05	·04	·02	·03	·04	·03	·02	·02	·05	·04		·06	·05	·07	·08	·09	·09
24	..	..	·02	..	..	..	..	·01	..	..	..	..	..	..	..	..	·01	..	..		..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
26	..	..	·02	·01	..	..	·01	·02	..	·02	·01	..	..	·03	·01	..	·01	·02	..		·01	..	·01	·03	..	·02
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..
*	·76	·68	·79	·49	·56	·58	·67	·72	·43	·52	·56	·34	·47	·64	·62	·65	·60	·67	·54		·73	·71	·93	1·45	1·36	1·61
†	11·63	11·76	12·56	9·22	9·87	9·73	10·57	11·59	8·36	11·20	10·75	10·66	11·51	11·92	10·31	10·50	9·90	11·13	10·26		10·97	10·88	12·05	11·06	11·95	11·80

RECORD CEASED.

OBSERVER DEAD.

* The figures in this row give the totals for the month. † The totals from January 1st.

July, 1899

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·13	·10	..	·12	·18
2	·04	·01	·07	·04	·08
3	..	..	..	·01	·02
4	..	..	..	..	..
5	..	..	..	..	..
6	..	·21	..	..	..
7	..	..	..	..	..
8	..	..	..	..	..
9	..	..	..	..	..
10	·09	·05	·05	·10	·10
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	..	..	..	..	..
19	..	..	..	..	..
20	..	..	..	·02	..
21	·06	·04	..	·04	·03
22	·84	1·00	·61	·50	·04
23	·12	·06	·03	·03	·60
24	..	..	..	..	·02
25	..	..	..	..	..
26	·01	..	..	..	..
27	..	..	..	..	..
28	..	..	..	..	..
29	..	..	..	..	..
30	..	..	..	..	..
31	..	..	..	..	..
*	1·29	1·47	·76	·86	1·07
†	12·20	10·90	9·04	10·57	8·86

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(July, 1899.)

An exceedingly hot, dry, and sunny month. The rainfall has varied very much owing to the thunderstorm on the 23rd, the rain accompanying which was exceedingly heavy in some parts of the district, more especially on the high ground towards the south. At Dorking (Denbies) the observer reports that the rain 1·42 in. fell in three-quarters of an hour; whilst in another thunderstorm on the 20th he reports that a large cedar tree was struck by lightning. The 20th was an exceedingly hot day, and so also was the 21st, the maximum thermometer in the shade being well over 85°, the Greenwich maximum on the 20th being 88·5°. Owing to the dry weather, all pastures and gardens are burnt up, and should rain not come soon there will be a great scarcity of vegetables in the autumn. Owing to the heat and dryness the month has been somewhat unhealthy, colds and influenza being somewhat prevalent, as well as summer diarrhœa. It is difficult to say what the deficiency of the rainfall is—in some parts it is only one-fourth of the average, whilst at Greenwich it is half the average—but probably, taking the district as a whole, we may say that only half the average amount has fallen. With respect to the temperature there have been about eight days with a shade temperature of over 80°, but it seems to have varied so much that no place exactly represents the district. The mean temperature is about 4·5° above the average, and was at Croydon (Duppas House) 66·9°, at Chipstead 66·8°, at Croydon (Whitgift) 66·4°, at Waddon 66·2°, at Wallington 66·1°, and at Redhill 64·9°. There were recorded at Wallington 278·4 hours of sunlight, which is eighteen per cent. above the July average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc., *Hon. Sec.*

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for August is 2·33 in.* **August, 1899.**

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jls.H.)	Warling-ham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leather-head
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	..	..	..	..	..	MONTHLY GAUGE.	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	..	·02	·01	·01	·01	·01	..	·01	·02	·02	..	·02	·02	·02	·05	·12			·11	·03	·02	·02	·05		..
6	..	..	·02	·01	·02	·02	·01	..	·01	..	·01	·02	·02	·02	..	·02	..			·03	..	·02	·04	·04		·02
7	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..			·02	..	..	..	..		..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	·01	·01	..	..	..	..	·01	..	·01	·01	..	..	·01	..	..	..	·09			·02	..	..	..	·02		..
28	·58	·57	·44	·53	·50	·49	·45	·35	·30	·45	·69	·42	·69	·37	·45	·91	·30			·40	·56	·54	·63	·52		·35
29	·15	·12	·13	·12	·09	·10	·12	·15	·11	·15	·06	·13	·19	·12	·11	·14	·17			·19	·12	·15	·14	·16		·17
30	..	..	..	·03	·06	·06	·01	..	..	..	·03	·01	·01	..	·02	·03	·04			·03	·03	·04	·11	·09		·07
31	·14	·04	·06	·03	·03	·04	·04	·03	·03	·04	·03	·03	·03	·03	·02	..	·03			·02	·02	·03	·04	..		..
*	·88	·74	·67	·73	·71	·72	·66	·53	·47	·67	·84	·61	·97	·56	·62	1·15	·75	·76	·82	·82	·76	·80	·98	·88	·57	·61
†	14·42	14·72	16·29	13·03	12·88	13·89	12·49	12·81	13·12	15·24	13·82	15·68	15·26	15·44	17·20	15·37	12·44	15·30	11·21	13·98	15·54	13·27	14·69	13·83	13·84	13·89

* The figures in this row give the totals for the month. † The totals from January 1st.

July, 1899

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·13	·10	..	·12	·18
2	·04	·01	·07	·04	·08
3	..	..	..	·01	·02
4	..	..	..	..	..
5	..	..	..	..	..
6	..	·21	..	..	..
7	..	..	..	..	..
8	..	..	..	..	..
9	..	..	..	..	..
10	·09	·05	·05	·10	·10
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	..	..	..	..	..
19	..	..	..	..	..
20	..	..	..	·02	..
21	·06	·04	..	·04	·03
22	·84	1·00	·61	·50	·04
23	·12	·06	·03	·03	·60
24	..	..	..	..	·02
25	..	..	..	..	..
26	·01	..	..	..	..
27	..	..	..	..	..
28	..	..	..	..	..
29	..	..	..	..	..
30	..	..	..	..	..
31	..	..	..	..	..
*	1·29	1·47	·76	·86	1·07
†	12·20	10·90	9·04	10·57	8·86

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(July, 1899.)

An exceedingly hot, dry, and sunny month. The rainfall has varied very much owing to the thunderstorm on the 23rd, the rain accompanying which was exceedingly heavy in some parts of the district, more especially on the high ground towards the south. At Dorking (Denbies) the observer reports that the rain 1·42 in. fell in three-quarters of an hour; whilst in another thunderstorm on the 20th he reports that a large cedar tree was struck by lightning. The 20th was an exceedingly hot day, and so also was the 21st, the maximum thermometer in the shade being well over 85°, the Greenwich maximum on the 20th being 88·5°. Owing to the dry weather, all pastures and gardens are burnt up, and should rain not come soon there will be a great scarcity of vegetables in the autumn. Owing to the heat and dryness the month has been somewhat unhealthy, colds and influenza being somewhat prevalent, as well as summer diarrhœa. It is difficult to say what the deficiency of the rainfall is—in some parts it is only one-fourth of the average, whilst at Greenwich it is half the average—but probably, taking the district as a whole, we may say that only half the average amount has fallen. With respect to the temperature there have been about eight days with a shade temperature of over 80°, but it seems to have varied so much that no place exactly represents the district. The mean temperature is about 4·5° above the average, and was at Croydon (Duppas House) 66·9°, at Chipstead 66·8°, at Croydon (Whitgift) 66·4°, at Waddon 66·2°, at Wallington 66·1°, and at Redhill 64·9°. There were recorded at Wallington 278·4 hours of sunlight, which is eighteen per cent. above the July average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc., *Hon. Sec.*

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for August is 2·33 in.* **August, 1899.**

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jls.H.)	Warling-ham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leather-head
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	..	..	..	..	..	MONTHLY GAUGE.	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	..	·02	·01	·01	·01	·01	..	·01	·02	·02	..	·02	·02	·02	·05	·12			·11	·03	·02	·02	·05		..
6	..	..	·02	·01	·02	·02	·01	..	·01	..	·01	·02	·02	·02	..	·02	..			·03	..	·02	·04	·04		·02
7	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..			·02	..	..	..	..		..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	·01	·01	..	..	..	..	·01	..	·01	·01	..	..	·01	..	..	..	·09			·02	..	..	..	·02		..
28	·58	·57	·44	·53	·50	·49	·45	·35	·30	·45	·69	·42	·69	·37	·45	·91	·30			·40	·56	·54	·63	·52		·35
29	·15	·12	·13	·12	·09	·10	·12	·15	·11	·15	·06	·13	·19	·12	·11	·14	·17			·19	·12	·15	·14	·16		·17
30	..	..	..	·03	·06	·06	·01	..	..	..	·03	·01	·01	..	·02	·03	·04			·03	·03	·04	·11	·09		·07
31	·14	·04	·06	·03	·03	·04	·04	·03	·03	·04	·03	·03	·03	·03	·02	..	·03			·02	·02	·03	·04	..		..
*	·88	·74	·67	·73	·71	·72	·66	·53	·47	·67	·84	·61	·97	·56	·62	1·15	·75	·76	·82	·82	·76	·80	·98	·88	·57	·61
†	14·42	14·72	16·29	13·03	12·88	13·89	12·49	12·81	13·12	15·24	13·82	15·68	15·26	15·44	17·20	15·37	12·44	15·30	11·21	13·98	15·54	13·27	14·69	13·83	13·84	13·89

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump.St.)	W.Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	..	..	·01	·03	·03	·03	·03	·03	·03	·04	·05	·05	·05	·05	·06	·07	·07	·07	·10	·13	·36	·12	·14	..	·42	·25
6	..	..	·04	·02	·03	·02	·03	·03	·03	·03	·03	·03	·03	·04	·04	·04	·04	·03	·04	·07	·03	·02	·02	..	·02	·03
7	·01	..	..	·02	·04	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	·01	·02	·03	..	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·03	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·03	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	·02	·01	·02	·05	..
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..
23	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	·01	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	·21	·15	·36	·43	·38	·37	·44	·34	·43	·47	·44	·40	·35	·48	·48	·49	·44	·40	·34	·40	·52	·29	·40	·37	·31	·47
29	·15	·17	·16	·16	·17	·11	·14	·14	·14	·15	·14	·15	·15	·12	·16	·12	·15	·13	·11	·09	·08	·08	·07	·05	·10	·12
30	·03	·02	·09	·04	·09	·05	·08	·03	·06	·07	·04	·02	·03	·09	·06	·06	·25	·06	·05	·30	·42	·33	·17	·39	·10	·07
31	·03	·01	·02	·01	..	·01	·01	..	·01	·01	·01	·01	·01	·01	·02	·01	·01	·01	..	..	·01	·01	·01	..	..	·01
*	·43	·35	·68	·72	·74	·59	·74	·57	·70	·78	·71	·67	·62	·79	·85	·80	·98	·70	·64	·99	1·43	·88	·87	·89	1·00	·95
†	12·10	11·07	13·81	11·60	11·98	12·04	11·90	10·32	12·06	12·45	12·33	12·55	11·31	12·70	13·19	14·82	14·86	13·89	13·46	12·34	13·54	12·94	13·86	11·46	12·08	13·26

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm. rd.)	Forest Hill (S&VWC	Sidcup	Wilmington	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..	..	..	..	..	..	..	..	..	OBSERVER MOVED. RECORD CEASED.	..	..	..	..	..	OBSERVER DEAD. RECORD CEASED.	..	..	..	..	..	..
2	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
3	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
4	..	..	·02	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
5	·19	·16	·09	·01	·07	·04	·04	·04	·02	..	·01	·02	·03		·04	·03	·03	·06	·07		·09	·07	·35	·12	·32	·17
6	·06	·04	·03	·03	·04	·04	·03	·04	·02	·02	..	·02	·02		·04	·03	·01	·04	·06		·05	·03	·03	·03	..	·02
7	·02	..	..	..	..	..	·01	·03	..	·01	·02	..	..		..	..	·01	..	..		..	..	..	·01	·04	..
8	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
10	..	..	·01	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	·02	..	..		..	..	..	..	..		..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	·03	·04	..
19	..	·01	·01	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		·01	·02	·02	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..		..	·01	..	·02	..		..	..	..	..	..	..
28	·43	·39	·36	·30	·36	·16	·19	·19	·20	·42	·18	·22	·29		·14	·12	·16	·23	·21		·19	·17	·35	·31	·46	·13
29	·13	·10	..	·12	·16	·06	·07	·09	·06	·11	·15	·07	·08		·07	·08	·08	·13	·13		·11	·07	·13	·08	·11	·13
30	·07	·04	·06	·03	·08	·05	..	·08	·06	·10	·05	·12	·04		·03	·06	·04	·05	·14		·04	·03	·13	·22	·10	·11
31	·02	·02	·02	..	..	·01	·05	·02	·02	·02	·03	·01	..		·01	·01	·01	·02	·01		·01	·02	·01	..	..	·01
*	·92	·76	·60	·49	·71	·36	·39	·49	·38	·68	·46	·46	·46		·33	·34	·34	·55	·60		·50	·41	1·02	·80	1·07	·57
†	12·55	12·52	13·16	9·71	10·58	10·09	10·96	12·08	8·74	11·88	11·21	11·12	11·97		10·64	10·84	10·24	11·68	10·86		11·47	11·29	13·07	11·86	13·02	12·37

* The figures in this row give the totals for the month. † The totals from January 1st.

August, 1899

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	..	..	..	..	..
2	..	..	..	..	..
3	..	..	..	..	..
4	..	..	..	..	..
5	·09	·07	·14	·05	·04
6	·02	·02	·04	·04	..
7	..	..	..	..	·03
8	..	..	..	..	..
9	..	..	..	..	..
10	..	..	..	..	..
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	..	..	..	..	..
19	..	..	·02	..	..
20	..	..	..	..	..
21	..	..	..	..	..
22	..	..	..	..	..
23	..	..	..	..	..
24	..	..	..	..	..
25	..	..	..	..	..
26	..	..	..	..	..
27	..	..	..	..	..
28	·15	·12	·12	·12	·10
29	·05	·03	·06	·05	·08
30	·01	..	·03	·04	..
31	·03	..	..	..	·14
*	·35	·24	·41	·30	·39
†	12·55	11·14	9·45	10·87	9·25

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(August, 1899.)

An exceedingly hot dry sunny month. Mr. Watson, of Croydon, remarks that "July with a mean temperature of 66·4°, and August with 66·2° are the two hottest months he has any record of, and the three summer months, June to August, with a rainfall of 2·18 in., are the three driest summer months in a record of over thirty years; and that with the exception of July 14th, when there was a deficiency of 0·8°, the mean daily temperature was above the average from July 6th to Sept. 10th." Complaints of the heat and drought are numerous, and the unhealthiness of the season was general, summer diarrhœa being especially prevalent, and cases of heat apoplexy being numerous, many of which were fatal. There was a very peculiar gust of wind and dust storm on the 15th at 5 p.m., which was noticed by the observers at Sidcup and Kenley. The observer at Kenley has written a very interesting account of it, too long for insertion here, but in which she calls special attention to a peculiar lull and airless feeling as is generally experienced before a hurricane. The storm only lasted about two or three minutes, and no rain fell, though lightning was seen at Sidcup and elsewhere. Thunderstorms occurred throughout the district on the 5th and 28th. The rainfall is about one-third of the average, and in the long record of Greenwich there is only one August with a smaller rainfall, *viz.* August, 1818, when the monthly total was only ·07 in. Solar halos were seen at Upper Gatton on the 2nd, 4th, and 31st. The mean temperature of the month is about 5° above the average, and was at Croydon (Duppas House) 67°, at Waddon 66·6°, at Croydon (Whitgift) 66·2°, at Wallington 66·1°, at Chipstead 65·9°, at Redhill 64·9°, and at Sevenoaks 64·5°. The maximum in the shade at Beddington was over 80° on seven days, and at Croydon (Waddon New Road) on nine days, and at Redhill on two days, and below 70° the days were respectively three, two, and one. There were recorded at Wallington 275·5 hrs. of sunlight, which is 18 per cent. above the August average of the ten years 1886–95.—F. Campbell-Bayard, P.R.Met.Soc., *Hon. Sec.*

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jas.H.)	Warling-ham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leather-head
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·04	·03	·03	·03	·03	·03	·02	..	·03	·04	·04	·04	·04	·05	·05	..	..	MONTHLY GAUGE.	MONTHLY GAUGE.	·02	·04	·04	·04	·07	MONTHLY GAUGE.	·04
2	·05	·09	..	·01	·02	·01	·02	·05	·02	·03	·03	·04	·07	..	·09	·07	..			·03	·03	·04	·05	·04		·06
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	·06		..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
6	·58	·48	·35	·48	·65	·79	·56	·59	·65	·62	·53	·38	·52	·58	·59	·69	·78			·64	·57	·54	·61	·37		·32
7	·05	·07	·02	..	·01	·01	·01	..	·01	..	·01	..	·01	..	..	·03	·02			·24	..	..	..	·15		·01
8	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..			..	·01	..	..	·03		..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	·18	·20	·24	·20	·22	·23	·19	·20	·19	·19	·19	·16	·17	·20	·24	·22	·21			·18	·25	·20	·22	..		·13
16	·11	·11	·11	·01	·11	·12	..	·02	·02	·04	·03	·13	·09	·06	..	·19	·13			·08	·10	·04	·05	·06		·02
17	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..			..	..	·01	..	..		..
18	..	..	..	..	·01	·01	..	·10	..	..	..	..	..	..	..	..	..			·01	..	·01	..	..		..
19	·11	·12	·12	·11	·12	·11	·09	·12	·12	·14	·15	·15	·13	·13	·15	·16	·14			·16	·13	·11	·16	·13		·10
20	..	..	..	..	..	..	..	·13	..	..	..	..	..	..	..	..	·21			..	..	..	..	·04		..
21	·10	·15	·11	·17	·25	·28	·17	·13	·13	·15	·14	·15	·14	·18	·13	·17	..			·25	·16	·13	·15	·12		·11
22	..	..	..	..	..	..	..	..	..	..	..	..	..	·04	..	..	..			..	..	..	..	..		..
23	·11	·08	·13	·07	·08	·07	·13	·08	·07	·05	·03	·03	·03	·01	·05	·07	·05			·04	·07	·04	·07	·09		·09
24	·03	·03	·03	·03	·05	·04	·02	·03	·03	·04	·04	·04	·03	..	·03	·03	·03			·03	..	·02	·03	·12		·04
25	·05	·05	·05	·05	·06	·06	..	·11	·04	·02	·03	·02	·02	·05	·03	·03	·07			·06	·05	·02	·01	·03		·02
26	..	·01	..	..	·01	·01	..	·01	..	..	..	..	..	·05	..	..	..			·05	..	..	..	·06		·01
27	·03	·08	·05	·04	·06	·07	·07	·06	·06	·05	·06	·05	·16	·03	·09	·09	·17			·18	·23	·21	·21	·15		·23
28	·16	..	·20	·10	·07	·07	·05	·17	·13	·17	·12	·17	·19	·14	·14	·08	..			·03	·04	·08	·05	·10		·06
29	1·26	1·24	1·47	1·20	1·03	1·04	1·37	1·17	1·13	1·19	·97	·88	1·00	1·10	·88	·96	1·01			1·05	·92	·92	·89	·95		1·12
30	·07	·16	·10	·04	·06	·05	·05	·04	·05	·08	·04	·08	·13	·14	·07	·08	·12			·19	·13	·10	·10	·12		..
*	2·93	2·90	3·01	2·54	2·84	3·00	2·76	3·04	2·69	2·81	2·41	2·33	2·73	2·76	2·54	2·88	2·94	2·85	2·55	3·24	2·73	2·51	2·64	2·69	2·59	2·36
†	17·35	17·62	19·30	15·57	15·72	16·89	15·25	15·85	15·81	18·05	16·23	18·01	17·99	18·20	19·74	18·25	15·38	18·15	13·76	17·22	18·27	15·78	17·33	16·52	16·43	16·25

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	..	·03	·04	·04	·04	·03	·04	·04	·04	·04	·03	·03	·04	·03	·04	·05	·05	·05	·05	·04	·04	·03	·06	·04	·02	·03
2	·16	·10	·05	·07	·07	·11	·14	·12	·14	·15	·16	·15	·19	·16	·07	·11	·05	·17	·39	·14	·18	·24	·35	·06	·22	·20
3	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	·33	·38	·40	·63	·43	·36	·44	·38	·44	·42	·47	·45	·45	·57	·53	·87	·75	·80	·87	·68	·50	·39	·73	·55	·75	·72
7	·02	·01	..	·03	·07	·08	·09	·10	·14	·14	·29	·21	·24	·17	·02	·06	·07	·08	·13	·10	·24	·19	·40	·03	·07	·04
8	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	·01	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	..	..	..	..	·01	·03	·02	·02	·02	·03	·04	·02	·02	·02	·04	·01	·02	..	..	..	..	..	..	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	·19	·17	·23	·23	·23	·20	·19	·17	·18	·19	·18	·18	·16	·18	·20	·21	·22	·21	·19	·16	·18	·18	·18	·13	·20	·21
16	·02	·01	·08	·15	·04	·01	·01	..	·01	·01	..	·01	·01	·01	·10	·24	·27	·20	·21	·13	·10	·04	·10	·05	·05	·06
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·02	..	..	..	..	..	..
18	..	..	..	·02	..	·01	·01	..	..	..	..	·01	..	..	..	..	..	·01	·01	..	·01	·02	·16	..	·06	·04
19	·16	·15	·16	·12	·11	·11	·10	·09	·10	·10	·09	·10	·10	·10	·12	·12	·13	·12	·11	·09	·10	·10	·11	·04	·11	·09
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·07	..	..
21	·10	·10	·13	·12	·11	·11	·11	·11	·11	·11	·10	·11	·11	·10	·12	·15	·14	·13	·12	·12	·11	·13	·11	·06	·09	·10
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·03	..	..
23	·03	·04	·04	·10	·09	·07	·06	·05	·05	·05	·05	·05	·04	·05	·04	·05	·04	·03	·02	·03	·02	..	..	..	..	..
24	·02	·02	·01	·03	·03	·04	·04	·04	·04	·04	·04	·04	·04	·04	·05	·05	·04	·05	·04	..	·04	·02	·01	..	·02	·02
25	..	..	·01	·01	..	·01	·01	..	·01	·02	..	..	·01	..	·01	·02	·01	·01	..	·05	·01	..	..	·09	..	..
26	·03	·03	..	·03	·02	·01	..	..	..	·02	·02	·02	..	·02	..	..	..	..	..	·01	..	..	..	..	..	..
27	·03	·10	·22	·03	·06	·05	·10	·06	·10	·10	·10	·08	..	·11	·16	·10	·11	·10	·12	·12	·13	..	·15	·08	·12	·10
28	·02	·02	·12	·03	..	·01	·01	·02	·01	·01	·01	·03	·02	·01	·02	·01	·02	·01	·03	·02	·02	·14	·04	·03	·02	·01
29	1·17	1·11	1·24	1·03	·91	·85	·83	·85	·87	·87	·71	·91	·93	·98	1·09	1·03	1·07	1·02	1·13	1·07	·90	·82	1·15	1·21	·69	·90
30	·03	·02	·10	·03	·07	·07	·05	·05	·03	·06	·10	·06	·08	·07	·09	·15	·11	·10	·10	·08	·08	·06	·20	·07	·08	·10
*	2·31	2·29	2·84	2·71	2·29	2·16	2·25	2·10	2·30	2·36	2·39	2·47	2·44	2·62	2·70	3·23	3·10	3·09	3·52	2·86	2·67	2·36	3·75	2·54	2·50	2·62
†	14·41	13·36	16·65	14·31	14·27	14·20	14·15	12·42	14·36	14·81	14·72	15·02	13·75	15·32	15·89	18·05	17·96	16·98	16·98	15·20	16·21	15·30	17·61	14·00	14·58	15·88

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm.rd.)	Forest Hill (S&VWC)	Sidcup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·04	·05	·03	·03	·03	·10	·01	·06	·05	·06	·05	·06	·07	OBSERVER MOVED. RECORD CEASED.	·04	·06	·06	·05	·04	OBSERVER DEAD. RECORD CEASED.	·05	·04	·03	·03	..	·03
2	·16	·41	·14	·18	·26	·02	·07	·16	·27	·21	·13	·29	·12		·02	·03	·03	·08	·08		..	·02	·08	·05	·04	·01
3	..	..	..	..	..	..	·09	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
4	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
5	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
6	·56	·79	·61	·36	·32	·96	·82	·79	·45	·35	·38	·52	·41		·41	1·12	·53	·49	·30		·36	·36	·54	·62	·65	·47
7	·10	·05	·24	·18	·15	·12	·28	·33	..	·01	..	..	..		·09	·10	·12	·10	·02		·07	·08	·07	·08	·05	·05
8	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	·02		..	..	..	·01	..		..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
11	..	..	..	..	..	..	·02	·03	..	..	..	..	..		..	..	..	..	..		..	·01	·01	..	..	..
12	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
15	·20	·17	·19	·16	·17	·15	·17	·16	·15	·12	·13	·16	·17		·16	·17	·16	·18	·18		·22	·21	·25	·15	·15	·20
16	·12	·08	·19	·10	..	·06	·15	·20	·03	·03	·04	·04	·03		·05	·01	·02	·02	·15		·24	·24	·11	·06	·06	·06
17	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
18	·04	·03	·04	..	..	·01	..	..	..	..	..	..	..		·01	·02	·03	·04	·04		·11	·08	·12	·01	..	·02
19	·09	·09	·09	·08	·11	·09	·10	·10	·09	·11	·10	·10	·10		·10	·11	·10	·10	·10		·11	·14	·10	·09	..	·11
20	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	·01	..	..		..	..	·01	..	..	..
21	·10	·11	·10	·09	·12	·14	·17	·15	·14	·16	·15	·16	·18		·16	·18	·15	·16	·13		·15	·16	·10	·10	·08	·13
22	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
23	·01	·02	..	·01	·05	·02	·07	·07	·09	·05	·07	·08	·10		·02	·01	·01	·01	..		·03	·01	..	..	·02	..
24	·02	·03	·03	·03	·03	·02	·03	·04	·02	·02	·03	·02	·03		·02	·02	·03	·02	..		..	·02	·02	..	..	·02
25	·01	·01	·01	..	..	..	..	·01	..	·01	..	..	..		..	..	·01	·02	..		·01	·01	·01	..	..	·01
26	..	..	·01	..	..	..	..	·01	..	·03	..	·03	..		..	..	·01	..	..		..	..	..	..	..	..
27	..	·12	·10	·07	·10	·32	·19	·09	·12	·09	·19	·10	·32		·12	·18	·15	·07	·01		·05	·07	·09	·09	·10	..
28	·01	·03	·01	·01	·03	·05	·05	·03	·02	·04	·04	..	·06		·02	..	·09	·03	·02		·09	·10	·01	·03	..	·08
29	·88	·90	1·02	·97	·84	·94	1·21	1·09	·92	1·15	1·06	1·00	1·05		1·00	·83	·84	1·03	·90		·98	·95	·91	1·04	1·10	·80
30	·08	·08	·07	·06	·08	·02	..	·03	·02	·03	·02	·01	·12		·02	..	·02	·02	·04		·06	·03	·09	·05	·05	·07
*	2·42	2·97	2·88	2·33	2·29	3·02	3·43	3·35	2·37	2·47	2·39	2·57	2·78		2·24	2·84	2·37	2·43	2·01		2·53	2·53	2·55	2·40	2·30	2·06
†	14·97	15·49	16·04	12·04	12·87	13·11	14·39	15·43	11·11	14·35	13·60	13·69	14·75		12·88	13·68	12·61	14·11	12·87		14·00	13·82	15·62	14·26	15·32	14·43

* The figures in this row give the totals for the month. † The totals from January 1st.

September, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·04	·02	·03	·05	·03
2	·02	..	..	·05	·02
3	..	..	..	..	..
4	..	..	..	..	..
5	..	..	..	..	..
6	·42	·42	·33	1·01	·95
7	·12	·03	·06	·15	·37
8	..	..	..	..	..
9	..	..	..	..	..
10	..	..	..	..	..
11	..	..	..	..	..
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	·21	·19	·17	·20	·18
16	·07	·14	·22	·07	·07
17	..	..	..	..	..
18	·02	..	·05	·12	·03
19	·15	·18	·07	·10	·15
20	..	..	..	..	..
21	·17	·15	·15	·18	·13
22	..	..	..	..	..
23	·02	..	..	·02	..
24	·02	..	·01	·02	·02
25	·01	..	..	·01	·01
26	..	..	..	..	..
27	·15	·13	·13	·44	·05
28	..	..	·01	·01	..
29	·78	·76	1·00	·99	·80
30	·06	·02	·01	·01	·04
*	2·26	2·04	2·24	3·43	2·85
†	14·81	13·18	11·69	14·30	12·10

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(September, 1899.)

A warm showery month. There were two noticeable thunderstorms, *viz.* on the 6th and 29th, and thunder and lightning occurred on many days. The thunderstorm on the 6th was preceded by heavy darkness, which was noticed by the observers at Kenley and Abinger Hall. The month has been somewhat unhealthy, and the number of sudden deaths that have taken place is remarkable. The observer at Abinger Hall reports that there were 4° of frost on the 20th, and that vegetable marrows were blackened. The rainfall of the month would appear to be about the average. The maximum thermometer in the shade was very high on the 5th, being considerably over 80°. Solar halos were observed at several stations in the district. The average temperature of the month is variable, ranging from half a degree below to about a degree above the mean, and was at Croydon (Duppas House) and Wallington 58·6°, at Waddon and Chipstead 58·3°, at Croydon (Whitgift) 58·2°, and at Redhill 56°. There were recorded at Wallington 176·2 hours of sunlight, which is 4 per cent. above the average for September of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc.,
Hon. Sec.

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	Reigate Hill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jos. H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·45	·34	·40	·29	·36	·39	·32	·38	·29	·33	·31	·30	·34	·33	·39	·55	·38	MONTHLY GAUGE.	MONTHLY GAUGE.	·71	·34	·22	·33	·32	MONTHLY GAUGE.	·31
2	·01	·01	·02	·03	·03	·03	..	·03	·03	·02	·03	·03	·03	..	·04	·04	..			·02	·14	·02	·02	·04		..
3	..	·01	..	·02	·02	·02	·02	·02	·02	·03	·03	·03	·01	·03	..	·07	·09			·05	·02	·02	·02	·03		..
4	·39	·38	·46	·34	·29	·31	·29	·31	·31	·38	·33	·37	·39	·47	·51	·39	·49			·55	·46	·40	·39	·43		·31
5	..	..	..	·01	..	..	..	..	..	..	·01	..	·01	..	..	..	·05			·02	·01	·01	..	·04		·03
6	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..			..	..	..	..	·02		..
7	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
11	..	·01	..	..	·02	·02	..	..	..	..	..	..	..	..	..	..	·03			..	..	..	..	..		..
12	·06	·08	·06	·09	·07	·07	·06	..	·08	·07	·08	·07	·07	·09	·10	·08	·07			·07	·08	·08	·08	·08		·07
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	·03		..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
20	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	·02		..
21	..	..	..	..	·01	..	..	..	·01	..	..	..	..	..	..	..	..			·01	..	..	..	·01		..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			·01	..	..	..	..		..
23	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			·01	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..			..	..	..	·02	..		..
26	·23	·20	·25	·22	·25	·25	·21	·32	·22	·22	·23	·22	·22	·24	..	·22	·24			·11	·25	·20	·18	·23		·30
27	·87	·98	1·00	·72	·65	·66	·64	·77	·78	·89	·71	·85	·73	·86	·84	·63	·56			·44	·78	·69	·75	·67		·88
28	·01	·03	..	..	..	..	..	·03	·01	·01	..	..	..	..	..	..	·04			·01	·07	·01	..	..		..
29	·45	·65	·50	·41	·44	·50	·38	·36	·36	·51	·51	·45	·44	·49	·55	·37	..			·37	·54	·28	·41	·25		·48
30	·01	·01	·02	·01	·01	·01	..	..	..	·01	·01	·01	·02	..	·03	..	..			·01	..	·02	·18	·08		..
31	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			·01	..	..	·02	..		..
*	2·48	2·72	2·71	2·14	2·18	2·29	1·92	2·22	2·12	2·48	2·25	2·33	2·26	2·51	2·46	2·35	1·95	2·29	1·72	2·40	2·69	1·95	2·40	2·25	2·36	2·38
†	19·83	20·34	22·01	17·71	17·90	19·18	17·17	18·07	17·93	20·53	18·48	20·34	20·25	20·71	22·20	20·60	17·33	20·44	15·48	19·62	20·96	17·73	19·73	18·77	18·79	18·63

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·28	·30	·37	·21	·22	·24	·23	·15	·28	·25	·20	·24	·20	·21	·29	·27	·30	·31	·34	·34	·36	·33	·47	·47	·24	·28
2	·01	·01	·01	·01	·01	·01	·01	..	·01	·01	·01	·02	·02	·02	·02	·03	·02	·02	·03	·02	·02	·02	·03	..	·02	·02
3	·03	..	·02	·03	·01	·02	·02	..	·02	·02	·03	·03	·02	·02	·03	·04	·03	·04	..	..	·03	·03	·02	·02	·04	·04
4	·26	·26	·39	·36	·41	·42	·41	·40	·43	·42	·43	·40	·40	·43	·45	·46	·42	·52	·50	·47	·43	·44	·49	·47	·45	·52
5	..	..	·01	·01	..	..	·01	..	·01	·01	·01	·01	·01	·01	·01	·02	·01	·01	·01	·02	·02	·02	·04	·08	..	·01
6	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	·02	..	..	·01	·03	·01	..	..
7	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
8	..	·01	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
10	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
11	..	..	..	..	..	..	..	·01	·01	·01	·01	·02	·01	·01	·01	..	·01	·01	..	..	..	..	..	..	..	..
12	·06	·05	·07	·05	·07	·07	·07	·06	·08	·08	·06	·06	·04	·07	·09	·09	·07	·06	·08	·05	·05	·05	·08	·06	·08	·10
13	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
18	..	..	..	·01	..	..	..	..	..	·01	·01	·01	..	·01	·01	..	·01	..	..	..	..	..	..	..	..	..
19	..	·01	..	..	·01	..	·01	..	..	·01	·01	·01	..	·01	·01	..	·01	..	..	..	..	..	·01	..	..	·02
20	..	·01	·01	·02	·02	·01	..	..	·02	·01	·01	·01	..	·01	·02	..	·01	..	..	..	·01	..	·02	..	..	·01
21	..	·01	·01	·01	·02	..	·02	..	·01	·02	·02	·01	..	·02	·02	..	·01	..	..	..	·01	..	·01	..	..	..
22	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	·01	..	..	·01	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	·01	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	·37	·30	·25	·24	·27	·27	·28	·36	·27	·29	·29	·27	·29	·29	·23	·23	·20	·24	·22	·19	·21	·21	·25	·25	·26	·27
27	1·10	1·05	·80	·96	·86	·87	·82	·92	·83	·82	·84	·89	·97	·80	·77	·71	·71	·76	·74	·60	·59	·55	·55	·51	·64	·79
28	..	..	..	..	..	..	..	..	..	..	..	·01	..	·01	..	..	..	..	..	..	..	..	..	..	..	..
29	·32	·28	·41	·37	·32	·36	·33	·32	·36	·32	·33	·31	·35	·35	·32	·35	·39	·41	·32	·29	·32	·34	·29	·20	·24	·32
30	·02	·03	·01	·03	·03	·02	·02	·03	·02	·03	·03	·05	·02	·03	·02	·08	·02	·01	·01	·03	·02	·04	·02	..	·02	·02
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*	2·45	2·32	2·36	2·32	2·25	2·30	2·23	2·25	2·35	2·38	2·30	2·35	2·33	2·30	2·31	2·28	2·24	2·40	2·27	2·01	2·07	2·04	2·31	2·07	1·99	2·40
†	16·86	15·68	19·01	16·63	16·52	16·50	16·38	14·67	16·71	17·19	17·02	17·37	16·08	17·62	18·20	20·33	20·20	19·38	19·25	17·21	18·28	17·34	19·92	16·07	16·57	18·28

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartmr.d.)	Forest Hill (S&VWC)	Sidcup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·23	·30	·22	·15	·15	·12	·18	·19	·19	·20	·23	·21	·11	RECORD CEASED.	·16	·14	·14	·19	·15	RECORD CEASED.	·04	·11	·23	·33	·30	·26
2	·02	·03	·02	·01	..	·01	·01	·01	..	·01	..	..	..		·01	..	..	·01	..		·02	·01	·02	·05	·02	·02
3	·05	·05	·04	·03	·02	·01	·01	·02	..	·02	·01	·01	·01		·02	·02	·02	·03	·05		·06	·03	·05	·04	·07	·08
4	·52	·48	·50	·41	·35	·20	·26	·25	·21	·18	·20	·20	·20		·18	·20	·23	·26	·36		·28	·28	·50	·43	·43	·42
5	·02	·02	·01	·02	..	·01	..	·01	..	·01	..	..	..		..	·01	·01	·01	·02		·02	·01	·02	·02	·05	·02
6	..	·02	..	..	..	·01	..	·01	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
7	..	..	..	..	..	·01	·01	·01	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
8	..	..	..	..	..	·01	·01	..	..	..	..	..	..		..	..	..	..	..		..	·01	..	..	..	..
9	..	..	..	..	..	·01	..	·01	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
10	..	..	..	..	..	..	·01	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
11	..	..	..	..	..	..	..	..	..	..	..	..	..		·01	..	..	..	..		..	..	..	..	..	..
12	·07	·07	·06	·06	·06	·06	·07	·07	·04	·03	·05	·04	·06		·06	·06	·08	·09	·08		·10	·09	·08	·06	·08	·07
13	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
17	..	..	..	..	..	..	·01	·01	..	..	..	..	..		..	..	..	..	..		..	·01	·01	..	..	..
18	..	..	..	..	..	·01	·01	·01	..	..	..	..	..		..	..	..	..	..		..	·01	..	..	..	..
19	..	..	·01	..	..	·01	..	·01	..	..	..	..	..		..	..	..	·01	..		..	·01	·01	..	..	..
20	..	..	·01	..	..	..	..	·02	..	..	..	..	..		..	..	·01	·01	..		..	·01	·01	..	..	..
21	..	..	·01	..	..	·01	·02	·02	..	·02	·03	·01	..		·02	·02	·01	·02	..		..	·01	·01	..	..	·01
22	..	..	..	..	..	·01	·02	·01	..	·01	..	..	..		..	..	..	..	..		..	..	·01	..	..	..
23	..	..	..	..	..	..	·01	..	..	..	..	..	·03		..	..	..	·01	..		..	·01	..	..	..	·01
24	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
26	·27	·26	·25	·24	·14	·24	·26	·26	·26	·29	·22	·29	·27		·23	·27	·24	·27	·25		·27	·13	·28	·25	·35	·24
27	·78	·66	·87	1·00	1·14	·96	1·06	1·02	1·20	1·15	1·18	1·16	1·20		1·06	1·18	·93	1·02	1·00		1·06	1·05	·75	·66	·72	·98
28	..	..	..	..	..	..	..	·01	..	·01	..	..	..		·01	..	..	..	..		·03	..	..	..	..	..
29	·30	·27	·30	·30	·30	·23	·28	·28	·24	·24	·27	·28	·30		·29	·30	·34	·43	·38		·41	·42	·27	·25	·15	·26
30	·02	·04	·03	·03	·04	..	·07	·03	..	·01	..	·01	..		·02	·04	·01	·03	·05		·04	·04	·02	..	·08	·02
31	..	..	..	..	..	..	·01	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
*	2·28	2·20	2·33	2·25	2·20	1·92	2·31	2·26	2·14	2·18	2·19	2·21	2·18		2·07	2·24	2·02	2·39	2·34		2·33	2·24	2·27	2·09	2·25	2·39
†	17·25	17·69	18·37	14·29	15·07	15·03	16·70	17·69	13·25	16·53	15·79	15·90	16·93		14·95	15·92	14·63	16·50	15·21		16·33	16·06	17·89	16·35	17·57	16·82

* The figures in this row give the totals for the month. † The totals from January 1st.

October, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·12	·10	·12	·17	·08
2	·01	..	..	..	..
3	·05	·03	·02	·01	·02
4	·30	·27	·24	·23	·10
5	..	..	·01	·02	·01
6	..	..	..	..	..
7	..	..	..	..	..
8	..	..	..	..	..
9	..	..	..	..	..
10	..	..	..	..	..
11	..	..	..	..	..
12	·11	·11	·08	·07	·07
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	..	..	..	..	..
19	..	..	..	..	..
20	..	..	..	..	..
21	..	..	..	..	..
22	..	..	..	·01	..
23	..	..	..	..	..
24	..	..	..	..	..
25	..	..	..	..	..
26	·28	·21	·25	·26	·21
27	1·02	·93	·96	1·06	·99
28	·01	·01	..	..	..
29	·40	·37	·32	·31	·22
30	·02	·02	·01	·08	·01
31	..	..	..	..	..
*	2·32	2·05	2·01	2·22	1·71
†	17·13	15·23	13·70	16·52	13·81

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(October, 1899.)

The month, as a whole, has been a calm one, with a mean temperature and total rainfall below the average. Fogs have been very prevalent, more especially between the 16th and 24th. The month has been an unhealthy one, and there have been cases of scarlet fever at Wallington and Nutfield, and in the latter place also diphtheria. The slight frosts that have occurred have done little or no injury to even the most delicate plants; and, as showing the mildness of the month, Dr. H. F. Parsons mentions that the Jerusalem artichoke was in flower at Addington on the 22nd, and at Warlingham there was a great crop of mushrooms, which continued till the 28th. The observer at Upper Gatton reports that a very fine solar halo with parhelia occurred on the 11th between 1.30 and 2.15 p.m. At Park Hill, Croydon, the maximum temperature was above 60° on one day, between 50° and 59° on twenty days, and between 40° and 49° on ten days; whilst the minimum was above 50° on one day, between 40° and 49° on ten days, between 33° and 39° on twelve days, and 32° and below on eight days. The rainfall is about half an inch below the average. The mean temperature of the month is about half a degree below the average, and was at Chipstead 49·7°, at Croydon (Whitgift) 49·5°, at Croydon (Duppas House) and Wallington 49·2°, at Waddon 48·8°, and at Redhill 47·5°. There were recorded at Wallington 121·8 hours of sunlight, which is 6 per cent. above the October average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc.,
Hon. Sec.

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	Reigate Hill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jas.H.)	Warlingham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leatherhead
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·19	·14	·12	·03	·14	·14	·18	..	·05	·18	·10	·21	·17	·20	·11	·07	..	MONTHLY GAUGE.	MONTHLY GAUGE.	·02	·13	·19	·16	·12	MONTHLY GAUGE.	·04
2	·36	·60	·46	·50	·31	·31	1·34	·35	·57	·39	·38	·38	·36	·29	·41	·67	1·02			·46	·34	·30	·34	·45		·53
3	1·70	2·18	1·50	1·45	1·20	1·36	·45	1·53	1·52	1·78	1·52	1·70	1·56	1·70	1·68	·90	1·23			·90	1·67	1·28	1·35	1·43		1·40
4	·51	·61	·52	·41	·30	·40	·41	·35	·39	·52	·44	·49	·52	·50	·55	·45	·34			·41	·49	·34	·36	·35		·44
5	1·55	1·48	1·57	1·45	1·53	1·52	1·49	1·53	1·45	1·44	1·54	1·44	1·51	1·48	1·45	1·74	1·68			1·85	1·59	1·39	1·40	1·51		1·50
6	·01	·01	..	·05	·01	·01	..	·02	·05	·01	·02	·01	·01	..	·03	..	..			..	..	·01	·01	·05		·02
7	·66	·72	·75	·68	·64	·72	·69	·70	·70	·70	·59	·66	·65	·65	·63	·70	·75			·82	·66	·61	·64	·68		·66
8	..	..	..	..	·01	·02	·01	..	..	..	..	..	..	..	..	..	..			..	·01	·01	·01	·03		..
9	·61	·63	·57	·56	·50	·53	·52	·62	·57	·57	·55	·59	·62	·60	·69	·59	·53			·58	·56	·51	·50	·54		·49
10	·01	·01	..	·01	·01	·01	·01	·02	·02	·02	·02	·02	..	..	·14	..	·01			·01	·04	..	·03	·05		·04
11	..	..	·02	·01	·03	·02	..	..	·04	·04	·03	·05	·07	·07	·10	..	·04			·04	·01	·04	·01	·04		·05
12	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
13	..	..	·02	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
14	·01	..	..	..	·01	·01	..	..	·01	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	·01	..	..	..	·01	·01	..	..	·01	·01	..	·01	..	..	·02	..	..			..	..	·01	·01	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
17	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..			..	..	..	..	..		..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			·02	..	..	..	..		..
20	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	·03	..	..	..		·01
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	·03		..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
29	..	..	..	..	·01	·01	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
*	5·62	6·38	5·53	5·15	4·73	5·09	5·10	5·12	5·38	5·66	5·19	5·56	5·48	5·49	5·81	5·12	5·60	5·18	3·91	5·11	5·53	4·69	4·82	5·28	5·37	5·18
†	25·45	26·72	27·54	22·86	22·63	24·27	22·27	23·19	23·31	26·19	23·67	25·90	25·73	26·20	28·01	25·72	22·93	25·62	19·39	24·73	26·49	22·42	24·55	24·05	24·16	23·81

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump. St.)	W. Wickhm (Wick. Ct.)	Hayes. Common	Keston (Bradfield)	Farn-borough	Orpington	Farming-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·13	·07	·12	·08	·10	·10	·12	·09	·13	·12	·10	·05	·09	·09	·12	·01	·09	·10	..	·12	·06	·06	·01	..	·04	·06
2	·44	·37	·41	·34	·35	·39	·33	·31	·35	·36	·34	·47	·39	·38	·27	·50	·41	·35	·22	·35	·35	·42	·44	·35	·29	·28
3	1·32	1·21	1·38	1·30	1·20	1·19	1·14	1·19	1·16	1·18	1·14	1·23	1·24	1·14	1·24	1·23	1·33	1·34	1·26	1·25	1·11	1·24	1·25	1·10	·98	1·10
4	·43	·35	·51	·32	·33	·34	·32	·28	·28	·32	·30	·35	·32	·27	·34	·34	·40	·36	·35	·40	·32	·44	·41	·29	·22	·27
5	1·50	1·46	1·51	1·48	1·49	1·44	1·39	1·30	1·48	1·45	1·51	1·40	1·48	1·35	1·38	1·50	1·45	1·62	1·50	1·60	1·44	1·53	1·69	1·60	1·40	1·57
6	..	..	·01	·01	..	..	..	·01	·01	·03	·01	·03	·01	·01	·01	·08	·02	·01	·02	·01	·02	..	·05	·05	·02	·03
7	·61	·55	·62	·50	·55	·59	·57	·50	·58	·58	·60	·55	·52	·47	·64	·68	·77	·76	·65	·68	·68	·75	·65	·45	·46	·58
8	·01	·01	..	·03	·03	·02	·02	·02	·02	·02	·02	·01	..	·02	·03	·04	·02	·02	·02	·01	·03	·02	..	..	..	..
9	·43	·40	·51	·36	·36	·37	·36	·33	·36	·36	·35	·34	·33	·37	·42	·41	·43	·43	·38	·41	·41	·42	·37	·32	·22	·32
10	..	·01	·02	·03	·03	·03	·04	..	·03	·03	·03	·04	·01	·03	·02	·04	·03	·02	·04	·02	·01	·02	·01	..	·02	·01
11	..	·02	·02	·08	·05	·05	·05	·09	·06	·05	·05	·07	·09	·05	·03	·05	·03	·02	·06	·02	·03	·05	·10	..	·14	·13
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
13	·03	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	·01	..	..	..
14	..	·01	·01	..	..	..	..	..	..	·01	·01	..	..	..	·01	..	·01	..	..	..	·01	..	·01	..	..	..
15	..	..	..	·01	..	..	..	..	..	..	..	..	..	·01	·01	..	·01	..	..	..	..	..	..	..	..	..
16	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·02	..	..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	·01	..	..	..	·01	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
29	..	..	..	·01	..	..	..	..	..	·01	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
*	4·90	4·46	5·13	4·55	4·49	4·52	4·34	4·12	4·46	4·52	4·46	4·54	4·48	4·19	4·54	4·88	5·02	5·03	4·52	4·87	4·49	4·95	5·00	4·16	3·79	4·35
†	21·76	20·14	24·14	21·18	21·01	21·02	20·72	18·79	21·17	21·71	21·48	21·91	20·56	21·81	22·74	25·21	25·22	24·41	23·77	22·08	22·77	22·29	24·92	20·23	20·36	22·63

* The figures in this row give the totals for the month. † The totals from January 1st.

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for November is 2·37 in.* **November, 1899.**

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartmr.d.)	Forest Hill (S&VWC)	Sidcup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·07	·06	..	·07	..	·03	·03	·05	·05	·06	·05	·06	·06	RECORD CEASED.	·05	·04	·05	·08	·04	RECORD CEASED.	·02	·05	·06	·01	..	·03
2	·30	·34	·36	·34	·42	·37	·39	·39	·36	·28	·27	·29	·30		·37	·47	·50	·39	·44		·39	·37	·28	·25	·38	·25
3	1·06	1·14	1·20	1·15	1·20	1·13	1·12	1·09	1·05	1·23	1·23	1·17	1·30		1·23	1·22	1·06	1·11	1·11		1·09	1·12	·98	·88	·91	1·12
4	·26	·26	·32	·30	·37	·20	·27	·22	·20	·38	·36	·30	·40		·23	·23	·24	·25	·21		·35	·24	·28	·31	·32	·24
5	1·50	1·45	1·46	1·35	1·45	1·44	1·56	1·47	1·40	1·37	1·23	1·43	1·39		1·39	1·53	1·34	1·44	1·45		1·30	1·37	1·44	1·50	1·50	1·41
6	·53	·30	·01	·02	..	·01	·01	·01	..	·02	..	..	..		·02	·02	·01	·01	·03		·02	·02	·01	·02	·03	·01
7	..	·56	·52	·41	·50	·36	·41	·44	·35	·39	·40	·43	·43		·34	·41	·40	·43	·35		·37	·36	·49	·53	·44	·40
8	..	·02	..	·01	..	·01	..	·01	..	·02	·01	..	..		·01	·01	·01	·01	..		..	..	..	..	..	..
9	·29	·32	·34	·25	·34	·34	·38	·39	·32	·49	·52	·46	·62		·41	·41	·38	·34	·31		·32	·32	·33	·31	·34	·26
10	·14	·03	·01	·01	..	·02	..	·01	..	·01	..	..	..		·01	·01	..	·01	..		..	·01	·02	·01	..	..
11	·01	·07	·15	·11	.09	·11	·13	·10	·04	·05	·04	·07	·09		·07	·05	·08	·09	·11		·07	·06	·04	·03	..	·02
12	..	..	..	·01	..	·01	·01	..	..	·01	..	..	..		·01	..	..	..	..		..	·01	..	..	..	..
13	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	·01	·01	·01	..	..	..	..	..		..	..	..	·01	..		..	·01	·01	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
17	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
18	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
19	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
20	..	·03	..	..	..	..	·01	..	..	..	·01	..	..		..	..	..	..	..		..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
22	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
23	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
24	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
25	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
26	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
27	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
28	..	..	..	..	..	·01	·02	..	..	..	..	..	..		..	..	..	..	..		..	·01	..	..	..	..
29	..	..	..	..	..	·01	..	·01	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
30	..	..	..	..	..	..	·01	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
*	4·18	4·58	4·37	4·03	4·37	4·06	4·36	4·20	3·77	4·31	4·12	4·21	4·59		4·14	4·40	4·07	4·17	4·05		3·93	3·95	3·94	3·85	3·92	3·74
†	21·43	22·27	22·74	18·32	19·44	19·09	21·06	21·89	17·02	20·84	19·91	20·11	21·52		19·09	20·32	18·70	20·67	19·26		20·26	20·01	21·83	20·20	21·49	20·56

November, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·04	·02	·03	·01	·02
2	·29	·33	·34	·56	·42
3	1·03	·97	1·01	1·14	1·10
4	·21	·16	·14	·20	·16
5	1·34	1·30	1·37	1·44	1·23
6	·01	..	·01	·06	·01
7	·37	·31	·29	·38	·27
8	..	..	..	..	..
9	·41	·33	·36	·40	·35
10	·01	..	..	..	..
11	·01	..	..	·04	·02
12	..	..	..	..	..
13	..	..	..	..	..
14	..	..	..	..	..
15	..	..	..	..	..
16	..	..	..	..	..
17	..	..	..	..	..
18	·01	..	..	..	..
19	..	..	..	..	..
20	..	..	..	..	..
21	..	..	..	..	..
22	..	..	..	..	..
23	..	..	..	..	..
24	..	..	..	..	..
25	..	..	..	..	..
26	..	..	..	..	..
27	..	..	..	..	..
28	..	..	..	..	..
29	..	..	..	..	..
30	..	..	..	..	..
*	3·73	3·42	3·55	4·23	3·58
†	20·86	18·65	17·25	20·75	17·39

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

NOTES.

(November, 1899.)

The month has been a very remarkable one. The small number of rainy days, the larger total fall, the absolute drought of, in most cases, nineteen days, the fact of two falls of over 1 in. only separated by a single day, present a curious record; but if we combine this with the extreme mildness of the weather, as shown by the fact of the numberless delicate flowers in blossom at the end of the month, the month has been a most wonderful one for November. It has been very unhealthy, rheumatic affections and scarlet fever being rather prevalent. Thunder and lightning occurred at Nutfield on the 2nd, and lightning only at Nutfield and Croydon on the 8th. Solar halos were seen at Croydon on the 7th, 9th, 12th, and 13th, and a lunar one on the 13th. The observer at Nutfield mentions a magnificent dawn on the 21st. The rainfall for the month is about 1·5 in. above the November average. The mean temperature of the month is about 4° above the average, and was at Croydon (Whitgift) 47·9°, at Waddon 47·7°, at Croydon (Duppas House) and Wallington 47·6°, and at Chipstead 46·2°. Fogs have been somewhat prevalent. There were recorded at Wallington 55·4 hours of sunlight, which is one per cent. above the November average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc.,
Hon. Sec.

F. Campbell-Bayard, F.R.Met.Soc.,
Hon. Sec.

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for December is 1·94 in.* **December, 1899.**

Day of Mo.	Abinger (The Hall)	Abinger (Rectory)	Dorking (Denbies)	Redhill	Nutfield (old gauge)	Nutfield (newgauge)	Buckland	Reigate	ReigateHill (Nutw. L.)	Upper Gatton	Merstham	Harp's Oak Cottage	Chipstead	Chaldon	Caterham	Westerham (Hill Est.)	Westerham (Town)	Knockholt (field gau.)	Knockholt (tower ga.)	Sevenoaks (St. Jns.H.)	Warling-ham	Coulsdon	Kenley (Hazelea)	Purley (Tudor C.)	Burgh Heath	Leather-head
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·20	·18	·24	·15	·18	·18	·13	·20	·19	·22	·23	·23	·24	·27	·25	·35	·19	MONTHLY GAUGE.	MONTHLY GAUGE.	·21	·28	·28	·25	·28	MONTHLY GAUGE.	·25
2	..	·02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
3	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..			..	..	..	..	..		..
4	·12	·10	·09	·05	·08	·08	·09	·08	·09	·10	·06	·08	·07	·08	·07	·24	·09			·10	·09	·07	·09	·09		·10
5	·07	·07	·10	·11	·12	·13	·08	·12	·12	·15	·16	·14	·09	·19	..	·09	·21			·20	·18	·21	·28	·38		·11
6	·05	·05	·06	·10	·07	·08	·06	·03	·08	·09	·08	·08	·06	·09	·28	·09	·10			·08	·14	·05	·05	..		·04
7	..	·02	..	..	..	..	..	·05	·01	·01	·02	..	·01	..	..	..	..			..	·02	·01	·01	·05		·02
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
10	..	..	..	·02	·01	..	..	..	·02	·02	..	·01	·02	..	·06	..	..			·01	·01	..	·01	..		..
11	·06	·04	·06	·01	·01	..	..	·03	·01	·02	·05	..	·02	..	..	..	..			·01	..	..	·03	·02		·02
12	·01	·03	..	·13	·08	·08	·12	·09	·12	·12	..	..	·11	·03	·04	..	..			·08	·02	..	..	·03		·06
13	..	..	..	..	..	..	..	..	..	..	..	..	..	·05	..	..	..			..	·03	..	..	..		..
14	..	·02	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	..	..		..
15	..	..	..	..	..	..	..	..	..	..	..	·09	..	..	..	..	..			..	..	..	..	..		..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01			..	..	..	..	..		..
17	·02	·01	·06	·03	·03	·03	·02	..	·03	·04	·03	·04	·06	..	·05	·15	..			..	..	..	·06	·03		..
18	·02	·04	..	·02	·02	·02	..	..	·03	·06	·06	·05	·02	·04	..	..	..			·03	·02	·10	·07	·12		..
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..			..	..	..	·01	..		..
20	..	..	..	..	..	..	..	..	..	..	..	·01	·04	..	..	..	..			..	..	..	..	..		..
21	·03	·03	·05	·03	·03	·03	..	..	·01	·03	·02	·02	..	·07	·10	..	..			..	·08	·02	..	·03		..
22	·09	·12	·10	·06	·05	·08	·08	..	·05	·03	·05	·04	·10	·04	·07	..	..			·02	·03	·03	·03	·05		·05
23	·04	·07	·10	·12	·14	·14	·11	·05	·11	·12	·13	·12	·12	·15	..	·19	·21			·14	·15	·11	·11	..		·19
24	·09	·10	·04	·03	·04	·04	·05	·04	·03	·04	·02	·03	·03	..	..	..	·03			·03	·03	·02	·03	·07		·05
25	·03	..	·04	..	·05	·05	..	..	·05	·05	·05	·05	·06	·08	·08	·08	·03			·06	·04	·07	·07	·10		·06
26	..	..	·04	·07	·04	·04	·07	..	·05	..	·06	·05	·05	..	·06	·05	..			·04	·01	·04	..	·02		·06
27	·05	·05	·03	..	·02	·03	·01	..	..	·06	·02	..	..	·06	..	·01	..			·05	·03	·02	·03	..		·02
28	·32	·29	·28	·22	·16	·16	·18	·20	·20	·21	·20	·22	·24	..	·25	·23	·36			·22	·06	·20	·27	·43		·30
29	·37	·35	·41	·26	·18	·25	·22	·23	·22	·23	·23	·24	·26	·40	·25	·22	·29			·23	·38	·20	·26	·32		·34
30	..	·03	·02	·01	·05	·05	·03	·03	·02	·01	·04	·02	·01	·03	·04	·04	..			·11	·14	·01	·02	..		..
31	·04	..	..	·04	·01	·01	..	·03	..	·01	..	·01	..	·01	..	·01	·03			·05	·01	..	..	·04		..
*	1·61	1·62	1·72	1·46	1·37	1·48	1·25	1·18	1·44	1·62	1·51	1·54	1·61	1·59	1·60	1·75	1·55	1·77	1·32	1·67	1·75	1·44	1·68	2·06	2·17	1·67
†	27·06	28·34	29·26	24·32	24·00	25·75	23·52	24·37	24 75	27·81	25·18	27·44	27·35	27·79	29·61	27·47	24·48	27·39	20·71	26·40	28·24	23·86	26·23	26·11	26·33	25·48

* The figures in this row give the totals for the month. † The totals from January 1st.

Day of Mo.	D'Abernon Chase	Oxshott	Banstead	Sutton	Wallington	Bedding-ton	Waddon	Croydon (Brim. Bn.)	Croydon (Wn.N.rd.)	Croydon (Dup. H.)	Croydon (Whitgift)	Croydon (Wob. rd.)	Croydon (Wdml.rd.)	Croydon (Park Hill)	Addington Hills	Addington (Park Fm.)	Addington (Pump.St.)	W. Wickhm (Wick. Ct.)	Hayes Common	Keston (Bradfield)	Farn-borough	Orpington	Farning-ham Hill	Southfleet	Chislehurst	Bickley
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·23	·25	·27	·24	·22	·25	·25	·23	·31	·26	·27	·26	·24	·28	·27	·30	·27	·31	·26	·25	·22	·20	·27	·20	·23	·25
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
3	·01	..	..	..	..	..	..	..	..	·01	..	..	..	·01	·01	..	·01	..	·02	..	..	..	..	..	..	..
4	·12	·10	·08	·08	·06	·08	·07	·08	·09	·09	·10	·11	·09	·09	·09	·09	·09	·09	·08	·05	·07	·09	·08	·05	·09	·09
5	·14	·15	·21	·31	·25	·22	·21	·20	·25	·21	·21	·23	·21	·22	·23	·24	·23	·15	·20	·20	·21	·21	·22	·18	·19	·20
6	·05	·05	·04	·03	·03	·03	·03	·03	·05	·04	·04	·05	·04	·04	·03	·04	·04	·06	·03	·03	·03	·03	·04	·07	·03	·04
7	..	·04	·01	·02	·01	·01	·01	·01	·02	·02	·02	·01	·02	·02	·02	·02	·02	..	·02	·02	·01	·01	·02	..	·02	·03
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	·01	·02	·02	·01	·02	..	·01	·02	·01	·01	..	·02	·03	..	·02	..	·03	·02	·01	..	..	..	..	·02
11	·02	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
12	·03	·06	·06	·03	·01	·02	·02	..	·01	·01	·02	·02	..	·01	·02	..	·01	·01	·02	..	·03	..	·01	·09	..	·02
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
15	..	..	..	..	·01	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
16	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
17	·06	·05	·05	·01	·04	·04	·04	..	·05	·03	·04	·03	·05	·03	·04	·12	·05	·02	·05	·05	·05	·06	·08	·07	..	·03
18	·07	·05	·09	·11	·10	·09	·09	·12	·10	·12	·10	·09	·10	·11	·09	·05	·10	·15	..	·11	·10	·06	·07	..	..	·07
19	..	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..	..	..	..	..	·01	..	..	..	..	..
20	..	..	·01	·01	·01	..	..	..	..	..	..	·02	..	·01	·01	..	..	..	·09	..	..	..	..	..	..	..
21	..	·02	·01	·01	·01	·01	·01	..	·03	·02	·02	·02	·01	·01	·02	·02	·01	·01	·01	..	·01	·01	..	..	..	·01
22	·05	·06	·07	·06	·07	·05	·05	·05	·06	·03	·06	·07	·01	·06	·05	·04	·03	·01	·04	·03	·03	..	·04	..	..	·06
23	·09	·08	·09	·07	·06	·07	·06	·05	·08	·07	·07	·07	·05	·07	·08	..	·04	·07	..	·04	·08	·09	·10	·14	·20	·06
24	·02	..	·03	·03	·02	·03	·03	..	·04	·03	·03	·03	·06	·02	·03	..	·03	..	·10	·03	·02	·02	·06	..	·05	..
25	·07	·08	·06	·07	·08	·07	·08	·08	·08	·08	·07	·07	·07	·07	·06	..	·06	·08	·08	·04	·05	·06	·07	..	·05	·09
26	·02	·04	·05	·08	·03	·04	·04	·03	·05	·05	·04	·05	·04	·05	·04	·08	·04	..	·06	·08	·04	·05	·06	·06	·03	·04
27	·02	..	·02	·01	·01	·01	·01	..	·01	·01	·02	·01	..	..	·02	..	·02	·02	·02	·04	·01	..	..	..	·01	·01
28	·40	·39	·31	·31	·28	·27	·26	·16	·27	·26	·25	·25	·23	·25	·30	·41	·38	·41	·32	·32	·36	·33	·25	·06	·20	·25
29	·30	·30	·31	·30	·29	·29	·27	·20	·35	·28	·30	·29	·26	·26	·30	·29	·30	·30	·29	·27	·30	·27	·25	·44	·15	·26
30	..	..	..	·01	..	..	..	..	·01	..	·01	·01	..	..	·01	..	·01	·01	·03	·02	·04	..	·01	·08	..	..
31	..	..	·01	·02	..	..	..	..	..	·01	..	..	..	..	·01	·02	·01	..	·01	..	·01	..	·02	..	..	..
*	1·70	1·72	1·80	1·83	1·61	1·59	1·55	1·24	1·87	1·66	1·69	1·70	1·48	1·63	1·76	1·72	1·77	1·70	1·76	1·60	1·70	1·49	1·65	1·44	1·25	1·54
†	23·46	21·86	25·94	23·01	22·62	22·61	22·27	20·03	23·04	23·37	23·17	23·61	22·04	23·44	24·50	26·93	26·99	26·11	25·53	23·68	24·47	23·78	26·57	21·67	21·61	24·17

* The figures in this row give the totals for the month. † The totals from January 1st.

Daily Rainfall. *The 80 years (1816–95) mean at Greenwich for December is 1·94 in.* **December, 1899.**

Day of Mo.	Bromley	Bromley Common	Beckenham	South Norwood	Thornton Heath	Wimbledon (Sew. Wks.)	Wimbledon (Mt. Ararat)	Raynes Park	New Malden	Esher	West Molesey	Surbiton	Kingston	Richmond	Putney Heath	Wandswth. Common	Streatham	West Norwood	Upper Norwood	Sydenham	Forest Hill (Dartm.rd.)	Forest Hill (S&VWC)	Sidcup	Wilming-ton	Dartford	Eltham
	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.	IN.
1	·23	·22	·25	·21	·25	·21	·24	·23	·19	·21	·22	·20	·25	RECORD CEASED.	·25	·22	·18	·24	·24	RECORD CEASED.	·26	·27	·24	·26	·21	·27
2	..	..	..	..	..	·01	..	..	..	·02	..	..	..		..	..	..	..	..		..	·01	..	..	..	..
3	..	..	..	..	..	..	·01	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	·01
4	·08	·08	·08	..	.09	·07	·07	·09	·05	·06	·05	·05	·06		·07	·07	·07	·08	·08		·08	·08	·10	·06	·05	·07
5	·20	·18	·19	·27	·15	·20	·25	·23	·30	·21	·21	·21	·35		·21	·22	·20	·21	·21		·20	·20	·19	·18	·17	·27
6	·04	·03	·04	·08	·10	·03	·04	·04	·02	·05	·06	·04	·04		·05	·06	·05	·06	·05		·05	·06	·05	·06	·05	·06
7	·02	..	·02	..	..	·01	·01	·01	..	·02	..	·01	..		·01	·01	·02	·02	·02		..	·01	·04	·02	..	·03
8	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
9	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	·01	..	..	..
10	·02	·03	·03	·04	..	·02	..	·03	..	..	..	..	..		·02	·01	·02	·01	·01		·03	·02	..	..	..	..
11	..	..	..	..	..	..	·01	..	..	·02	..	..	..		..	..	..	..	..		·05	..	..	·02	..	·01
12	·03	·05	·04	·04	..	·01	..	·04	·02	·07	·10	·06	..		·05	·05	·03	·02	..		..	·02	·02	·01	..	·03
13	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
14	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
15	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		·02	..	..	..	..	..
16	..	..	..	..	..	..	·02	..	..	..	..	..	..		..	..	..	..	..		..	..	..	..	..	..
17	·02	..	·02	·02	..	·02	..	·03	..	·06	·02	·04	·09		·03	·03	..	·03	..		..	·02	..	·05	·15	·02
18	·08	·10	·09	·08	..	·04	·02	·05	·08	·03	·02	·04	·03		·03	·04	·05	·06	·10		·02	·03	·07	·03	..	·03
19	..	..	·01	..	..	·01	·05	·01	..	..	..	..	..		..	..	..	·01	..		·03	·01	·02	..	..	..
20	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	·01	..	..		·02	..	..	..	..	..
21	·01	..	·01	..	..	·01	·01	·02	·01	·02	·02	..	·02		·02	·01	·01	·02	·02		·01	·01	·02	..	..	..
22	·05	·06	·06	·04	..	·05	·07	·09	·07	·08	·07	·08	·08		·06	·06	..	·05	·07		..	·04	·05	·04	·05	·03
23	·06	·07	·07	·06	..	·06	·05	·05	·04	..	·05	·06	·06		·06	·06	·11	·06	·05		·06	·07	·08	·09	·08	·07
24	·05	·04	·05	·04	..	·02	·05	·05	·06	·05	·08	·02	..		·02	..	..	·04	..		·04	·02	·05	·02	..	·01
25	·06	·06	·07	·06	..	·03	·03	·03	·02	·02	·03	·02	..		·03	·04	·08	·04	·07		..	·06	·08	·05	·05	·04
26	·05	·03	·04	·04	·35	·05	·03	·04	·03	·06	·03	·03	·04		·06	·03	·06	·05	·06		·06	·05	·05	·03	·03	·03
27	·01	..	·01	..	·06	·01	..	·02	..	·03	·01	..	·01		·01	..	·01	·01	..		..	·01	·02	..	..	..
28	·22	·24	·20	·16	·07	·08	·11	·13	·14	·21	·18	·17	·18		·13	·17	·12	·14	·16		·11	·14	·25	·20	·28	·20
29	·23	·26	·26	·21	·35	·15	·19	·23	·16	·26	·20	·24	·25		·19	·19	·10	·22	·16		·22	·24	·22	·21	·20	·20
30	..	·02	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..		·04	..	..	..	..	..
31	..	..	..	..	..	·01	..	..	..	..	..	..	..		..	..	..	..	..		·02	·01	·02	·02	..	..
*	1·46	1·47	1·54	1·35	1·42	1·10	1·26	1·42	1·19	1·48	1·35	1·27	1·46		1·30	1·27	1·12	1·37	1·30		1·32	1·38	1·58	1·35	1·32	1·38
†	22·89	23·74	24·28	19·67	20·86	20·19	22·32	23·31	18·21	22·32	21·26	21·38	22·98		20·39	21·59	19·82	22·04	20·56		21·58	21·39	23·41	21·55	22·81	21·94

December, 1899.

Day of Mo.	Greenwich	Deptford	Nunhead	Brixton	Battersea
	IN.	IN.	IN.	IN.	IN.
1	·29	·24	·21	·25	·21
2	..	..	..	..	..
3	·01	..	..	..	..
4	·11	·08	·06	·06	·07
5	·23	·18	·18	·20	·17
6	·06	·05	·03	·05	·04
7	·05	·01	·01	..	..
8	..	..	..	..	..
9	..	..	..	..	..
10	·02	·02	..	·03	..
11	..	..	..	..	..
12	·03	·04	..	·02	..
13	..	..	..	..	·01
14	..	..	..	..	..
15	..	..	..	..	·01
16	..	..	..	..	..
17	·02	..	..	·04	..
18	·02	·01	..	·03	·01
19	..	..	·01	..	..
20	..	..	..	·01	..
21	·01	..	..	·01	..
22	·03	·02	·05	·06	·02
23	·06	·05	·04	·06	·04
24	..	..	..	·01	·01
25	·05	·05	·05	·05	·05
26	·05	·04	·03	·05	·02
27	·01	..	..	..	..
28	·18	·13	·15	·16	·11
29	·24	·18	·15	·19	·15
30	..	..	..	..	..
31	..	..	..	..	..
*	1·47	1·10	·97	1·28	·92
†	22·33	19·75	18·22	23·03	18·31

Note.—The observations are taken at 9 a.m., except at Redhill, Reigate Hill (Nutwood Lodge), Addington (Park Farm), and Brixton (8 a.m.), Croydon (Woburn Road) (8.30 a.m.), and Sevenoaks (10 a.m.).

(December, 1899.)

The month has been damp, cold, and exceedingly unhealthy, more especially towards the end. The rainfall is about half-an-inch below the average, but the number of rainy days is greatly in excess. Snow fell on five days, but the principal fall was on the 12th, when the average depth was about an inch. The observer at Sidcup reports that *Cydonia japonica* was in bloom on the 8th. Fogs have been somewhat prevalent, especially on the 7th, 15th, 18th, 19th, 20th, and 23rd. With respect to the last-mentioned day, the observer at Nutfield reports that "a dense wall of fog rolled up from the south, and in ten minutes one could not see a yard in front." Influenza, chest affections, and rheumatism have been exceedingly prevalent, and many deaths have occurred throughout the district. The self-recording barometer at Wallington fell to 28·40 in. at 5 p.m. on the 29th. Solar halos were seen at Upper Gatton on the 9th, 20th, and 26th, and at Croydon on the 9th and 26th; whilst lunar halos were seen at Upper Gatton on the 10th, 11th, and 13th, and at Croydon and Wallington on the 10th and 13th. At Croydon the maximum thermometer was between 50° and 51° on two days, between 40° and 49° on nine days, between 30° and 39° on nineteen days, and under 30° on one day; whilst the minimum thermometer was 40° and above on four days, between 30° and 39° on nine days, between 20° and 29° on fifteen days, and below 20° on three days. The observer at Redhill reports that on three days the temperature did not rise in the shade at any time above 32°. The mean temperature of the month is about 2·5° below the average, and was at Croydon (Whitgift) 36·8°, at Croydon (Duppas House) 36·3°, at Chipstead and Wallington 36·1°, and at Waddon 35·7°. There were recorded at Wallington 37·9 hours of sunlight, which is one per cent. below the December average of the ten years 1886–95.

F. Campbell-Bayard, P.R.Met.Soc., *Hon. Sec.*

APPENDIX II.

Falls of 1·00 in. and upwards.

July 23rd.—Dorking (Denbies) 1·42 in.; Caterham 1·32 in.; Harp's Oak Cottage 1·31 in.; Chaldon 1·14 in.; Upper Gatton 1·13 in.; Eltham 1·08 in.; Deptford 1·00 in.

September 6th.—Wandsworth Common 1·12 in; Brixton 1·01 in.

September 29th.—Dorking (Denbies 1·47 in.; Buckland 1·37 in.; Abinger (The Hall) 1·26 in.; Abinger (Rectory) and Banstead 1·24 in.; Southfleet and Wimbledon (Mt. Ararat) 1·21 in.; Redhill 1·20 in.; Upper Gatton 1·19 in.; Reigate and D'Abernon Chase 1·17 in.; Farningham Hill and Esher 1·15 in.; Reigate Hill (Nutwood Lodge) and Hayes Common 1·13 in.; Leatherhead 1·12 in.; Oxshott 1·11 in.; Chaldon and Dartford 1·10 in.; Addington Hills and Raynes Park 1·09 in.; Addington (Pumping Station) and Keston (Bradfield) 1·07 in.; West Molesey 1·06 in.; Sevenoaks (St. John's Hill) and Kingston 1·05 in.; Nutfield (new gauge) and Wilmington 1·04 in.; Nutfield (old gauge), Sutton, Addington (Park Farm), and West Norwood 1·03 in.; West Wickham (Wickham Court) and Beckenham 1·02 in.; Westerham (Town) 1·01 in.; Chipstead, Surbiton, Putney Heath, and Nunhead 1·00 in.

October 27th.—New Malden and Kingston 1·20 in.; West Molesey and Wandsworth Common 1·18 in.; Surbiton 1·16 in.; Esher 1·15 in.; Thornton Heath 1·14 in.; D'Abernon Chase 1·10 in.; Wimbledon (Mt. Ararat), Putney Heath, Forest Hill (Dartmouth Road) and Brixton 1·06 in.; Oxshott and Forest Hill (Southwark and Vauxhall Water Co.) 1·05 in.; Raynes Park, West Norwood, and Greenwich 1·02 in.; Dorking (Denbies), South Norwood, and Upper Norwood 1·00 in.

November 2nd.—Buckland 1·34 in.; Westerham (Town) 1·02 in.

November 3rd.—Abinger (Rectory) 2·18 in.; Upper Gatton 1·78 in.; Abinger (The Hall), Harp's Oak Cottage, and Chaldon 1·70 in.; Caterham 1·68 in.; Warlingham 1·67 in.; Chipstead 1·56 in.; Reigate 1·53 in.; Reigate Hill (Nutwood Lodge) and Merstham 1·52 in.; Dorking (Denbies) 1·50 in.; Redhill 1·45 in.; Purley (Tudor Cottages) 1·43 in.; Leatherhead 1·40 in.; Banstead 1·38 in.; Nutfield (new gauge) 1·36 in.; Kenley (Hazelea) 1·35 in.; West Wickham (Wickham Court) 1·34 in.; Addington (Pumping Station) 1·33 in.; D'Abernon Chase 1·32 in.; Sutton and Kingston 1·30 in.; Coulsdon 1·28 in.; Hayes Common 1·26 in.; Keston (Bradfield) and Farningham Hill 1·25 in.; Croydon (Windmill Road), Addington Hills, and Orpington 1·24 in.; Westerham (Town), Croydon (Woburn Road), Adding-

ton (Park Farm), Esher, West Molesey, and Putney Heath 1·23 in.; Wandsworth Common 1·22 in.; Oxshott 1·21 in.; Nutfield (old gauge), Wallington, Beckenham, and Thornton Heath 1·20 in.; Beddington and Croydon (Brimstone Barn) 1·19 in.; Croydon (Duppas House) 1·18 in.; Surbiton 1·17 in.; Croydon (Waddon New Road) 1·16 in.; South Norwood 1·15 in.; Waddon, Croydon (Whitgift), Croydon (Park Hill), Bromley Common, and Brixton 1·14 in.; Wimbledon (Sewage Works) 1·13 in.; Wimbledon (Mt. Ararat), Forest Hill (Southwark and Vauxhall Water Co.), and Eltham 1·12 in.; Farnborough, West Norwood, and Upper Norwood 1·11 in.; Southfleet, Bickley, and Battersea 1·10 in.; Raynes Park and Forest Hill (Dartmouth Road) 1·09 in.; Bromley and Streatham 1·06 in.; New Malden 1·05 in.; Greenwich 1·03 in.; Nunhead 1·01 in.

November 5th.—Sevenoaks (St. John's Hill) 1·85 in.; Westerham (Hill Estate) 1·74 in.; Farningham Hill 1·69 in.; Westerham (Town) 1·68 in.; West Wickham (Wickham Court) 1·62 in.; Keston (Bradfield) and Southfleet 1·60 in.; Warlingham 1·59 in.; Dorking (Denbies) and Bickley 1·57 in.; Wimbledon (Mt. Ararat) 1·56 in.; Abinger (The Hall) 1·55 in.; Merstham 1·54 in.; Nutfield (old gauge), Reigate, Orpington, and Wandsworth Common 1·53 in.; Nutfield (new gauge) 1·52 in.; Chipstead, Purley (Tudor Cottages), Banstead, and Croydon (Whitgift) 1·51 in.; Leatherhead, D'Abernon Chase, Addington (Park Farm), Hayes Common, Bromley, Wilmington, and Dartford 1·50 in.; Buckland and Wallington 1·49 in.; Abinger (Rectory), Chaldon, Sutton, Croydon (Waddon New Road), and Croydon (Windmill Road) 1·48 in.; Raynes Park 1·47 in.; Oxshott and Beckenham 1·46 in.; Redhill, Reigate Hill (Nutwood Lodge), Caterham, Croydon (Duppas House), Addington (Pumping Station), Bromley Common, Thornton Heath, and Upper Norwood 1·45 in.; Upper Gatton, Harp's Oak Cottage, Beddington, Farnborough, Wimbledon (Sewage Works), West Norwood, Sidcup, and Brixton 1·44 in.; Surbiton 1·43 in.; Eltham 1·41 in.; Kenley (Hazelea), Croydon (Woburn Road), Chislehurst, and New Malden 1·40 in.; Coulsdon, Waddon, Kingston, and Putney Heath 1·39 in.; Addington Hills 1·38 in.; Esher, Forest Hill (Southwark and Vauxhall Water Co.), and Nunhead 1·37 in.; Croydon (Park Hill) and South Norwood 1·35 in.; Streatham and Greenwich 1·34 in.; Croydon (Brimstone Barn), Forest Hill (Dartmouth Road), and Deptford 1·30 in.; West Molesey and Battersea 1·23 in.

146.—Notes of Ground Temperature during 1899.

By H. F. Parsons, M.D., F.G.S.

(Read February 20th, 1900.)

The annexed table shows the means of daily readings of thermometers in the ground at depths of 1 ft. and of 4 ft. for periods of four weeks in 1899, as compared with the average of the three previous years 1896–8.

The general course of the rise and fall of temperature in the soil has been described by me in former papers read before the Club. The special features of 1899, as compared with the previous triennial average, were, first, the steady fall of the ground temperatures from January to March, due to the spell of cold weather in the latter part of February and March; and, second, the high and sustained temperature of the ground in the latter part of the summer, due to the hot and dry weather which prevailed in July, August, and the earlier part of September.

Of the 1 ft. thermometer the lowest reading was 35·2° on March 25th, against 36·9° in 1898, 34·2° in 1897, and 35·8° in 1896. (During the long frost of 1895 the thermometer was below 32° for about a fortnight; but being frozen into the tube, the lowest reading could not be ascertained.) The highest temperature in 1899 was 71·7° on July 22nd, which is higher than any reading in the three previous years; the highest in 1898 and 1897 having been 69°, and in 1896 71·1°.

Of the 4 ft. deep thermometer the lowest reading in 1899 was 41·7° on March 27th and 28th, against 42·0° in 1898, 39·7° in 1897, and 42·0° in 1896, and 37·4° in 1895. The highest temperature in 1899 was 64° on August 5th–8th, against 62·3° in 1898, 63·5° in 1897, and 62·6° in 1896.

The 4 ft. thermometer stood at or above 56° from June 12th to October 8th = 119 days, against 113 days in 1898 and 1897, and 123 days in 1896.

The hot dry weather of the summer of 1899 was unfavourable to health, epidemic diarrhœa having been more fatal than in any year since 1884, and enteric fever more fatal than in any year since 1893; while the infant mortality was the highest on record in any year since 1848. It would seem as if the effect of hot summers in the production of epidemic diarrhœa were cumulative: 1899 is the fourth hot dry summer in succession, and the death-rate from diarrhœa has steadily increased from 55 per 100,000 persons living in 1896, to 98 in 1899.

Earth Temperatures.

Periods of 4 weeks.

	Average 1896–98.		*1899.*	
PERIOD.	1 FT.	4 FT.	1 FT.	4 FT.
1	40·2	43·8	41·8	45·4
2	40·8	44·9	40·8	43·8
3	41·7	43·2	38·3	42·7
4	45·8	45·4	45·9	44·6
5	51·7	48·8	50·8	48·2
6	58·8	53·5	59·4	53·4
7	63·8	58·0	64·0	58·2
8	64·8	61·0	68·5	62·6
9	60·1	60·5	66·2	63·0
10	56·9	58·2	56·2	59·1
11	50·1	54·0	49·0	52·9
12	44·4	49·2	46·7	50·7
13	41·3	45·9	38·4	45·4

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